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Administration

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November 1984

Final Report

Side-Impact Aggressiveness Attributes MDB-To-Car Side Impact Test of a 19° Crabbed Moving Deformable Barrier to a 1981 Volkswagen Rabbit at 46.0 Mph



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Technical Report Documentation Page

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16. Abstract This test report documents one of a series of twelve crash tests to evaluate the side impact aggressiveness attributes of various deformable barrier face configurations. The configurations to be used are designated as "Lowered Stiffness", "Altered Profile" and "Lowered Bumper". Testing was conducted on a 1981 diesel Volkswagen Rabbit 2-door hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was structurally unmodified but contained additional padding on the driver's side door, the left rear quarter panel and the left rear side header. The test vehicle was impacted on the left side by a moving deformable barrier designated as "Altered Profile", crabbled to 19 ⁰ , at 46.0 mph. Occupant responses of two side impact dummies were measured. One dummy was located in the driver's designated seating position and one was located in the left rear passenger position. The test date was October 8, 1984 and the ambient temperature was 72 ⁰ F.					
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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate the side impact aggressiveness of a deformable barrier face designated as "Altered Profile". In all, there will be twelve crash tests involving deformable barrier faces designated as "Lowered Stiffness", "Altered Profile" and "Lowered Bumper". The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A stationary 1981 diesel Volkswagen Rabbit 2-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on October 8, 1984. The barrier face was designated as "Altered Profile". In order to obtain the desired stiffness of 45 psi, 33 holes with a nominal diameter of 3 inches were drilled into the aluminum honeycomb, equally spaced throughout the back of the barrier face. The test was to simulate an intersection collision with the striking vehicle traveling at 35 mph and the struck vehicle traveling at 17.5 mph. The orientation angle of the striking vehicle was 60° counterclockwise with respect to the longitudinal axis of the struck vehicle. The impact point was to be 37 inches forward of the vehicle center of gravity which is defined by accident investigation to be the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Volkswagen Rabbit at 46.3 mph with the MDB's wheels crabbed clockwise to 19°. The actual test speed was 46.0 mph and the actual impact point was 37.5 inches forward of the midpoint of the Volkswagen Rabbit's wheelbase.

The vehicle was structurally unmodified but contained additional padding in the driver's door, the left rear quarter panel and the left rear side header.

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains data required by R & D. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Data Plots, and Appendix C consists of Dummy Certification data.

SECTION 2.0
GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Volkswagen of America, Inc.

MAKE/MODEL: Volkswagen Rabbit Diesel VIN: 1VWBG0179BV029614

BODY STYLE: 2-Door Hatchback MODEL YEAR: 1981

NHTSA NO.: R & D COLOR: Green

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 1700 cc

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 9/25/84 ODOMETER READING: 44108

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	No	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	Sun Roof		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Volkswagen of America, Inc.

DATE OF MANUFACTURE: 11/80

GVWR: 2822 LBS.,

GAWR: FRONT 1609 LBS., REAR 1278 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 32 psi; REAR 32 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): LRR 155 SR 13 M/S

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING 4

IS SPARE TIRE "SPACE SAVER"? No

IS SPARE TIRE STANDARD EQUIPMENT? Yes

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH ESTIMATED FLUIDS):

RIGHT FRONT	655	LBS	RIGHT REAR	380	LBS.
LEFT FRONT	645	LBS	LEFT REAR	380	LBS.
TOTAL FRONT WEIGHT	1300		LBS.	(63.1 % OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	760		LBS.	(36.9 % OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2060		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 24 5/8	;LF 24 15/16	;RR 24 3/16	;LR 24 5/16
PRE-TEST ATTITUDE:	RF 23 5/16	;LF 23 1/2	;RR 21	;LR 21 1/4
POST-TEST ATTITUDE	RF 23 3/4	;LF 24	;RR 21 1/8	;LR 22 7/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 135 LBS. CARGO:

RIGHT FRONT	725	LBS	RIGHT REAR	550	LBS.
LEFT FRONT	675	LBS	LEFT REAR	600	LBS.
TOTAL FRONT WEIGHT	1400		LBS.	(54.9 % OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1150		LBS.	(45.1 % OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2550		LBS.		

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 0 LBS.

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS

TEST VOLUME: 2.0 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 10.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No

FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 27 psi; REAR 27 psi

RECOMMENDED TIRE SIZE: 155 SR 13 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Front - Bucket
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT
2 REAR

CARGO LOAD 135 LBS. 4 TOTAL

TOTAL 735 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

TEST CONDITIONS

TEST NUMBER· 841008

DATE OF TEST· October 8, 1984

TIME OF TEST· 14:10

WIND VELOCITY: 3--6 mph 162° SE

HUMIDITY· NA

AMBIENT TEMPERATURE AT IMPACT AREA: 63° F

TEMPERATURE IN OCCUPANT COMPARTMENT 72° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	2550	2543
MDB TEST WEIGHT (LBS.)	2990	3000
MDB VELOCITY (MPH)*	46.0	46.3
IMPACT POINT (INCHES)**	37.5	37.0

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	SID			SID	
SERIAL NO :	06			U02	
INSTRUMENTATION:					
HEAD ACCEL.·	Yes			Yes	
CHEST ACCEL.	Yes (Upper/Lower)			Yes (Upper/Lower)	
FEMUR L.C.'S:	No			No	
OTHER	Pelvis/Ribs			Pelvis/Ribs	

RESTRAINT SYSTEM: Both dummies were unrestrained

* As measured over final one foot of travel.

** As measured forward of the midpoint of the vehicle's wheelbase.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 06	PASSENGER U02
Head	<u>MDB Face Plate Pillar, Roof Front Passenger Head Rest</u>	<u>Side Header, MDB Face Plate Pillar</u>
Chest	<u>Inner Door Panel</u>	<u>Left Rear Quarter Panel</u>
Abdomen	<u>Inner Door Panel</u>	<u>Left Rear Quarter Panel</u>
Left Knee	<u>Inner Door Panel, Lower Dash</u>	<u>Left Rear Quarter Panel</u>
Right Knee	<u>Lower Dash, Left Knee</u>	<u>Left Knee</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>DNA*</u>	<u>Easy</u>
Rear	<u>DNA</u>	<u>DNA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>Yes</u>	<u>Yes</u>
Rear	<u>No</u>	<u>No</u>

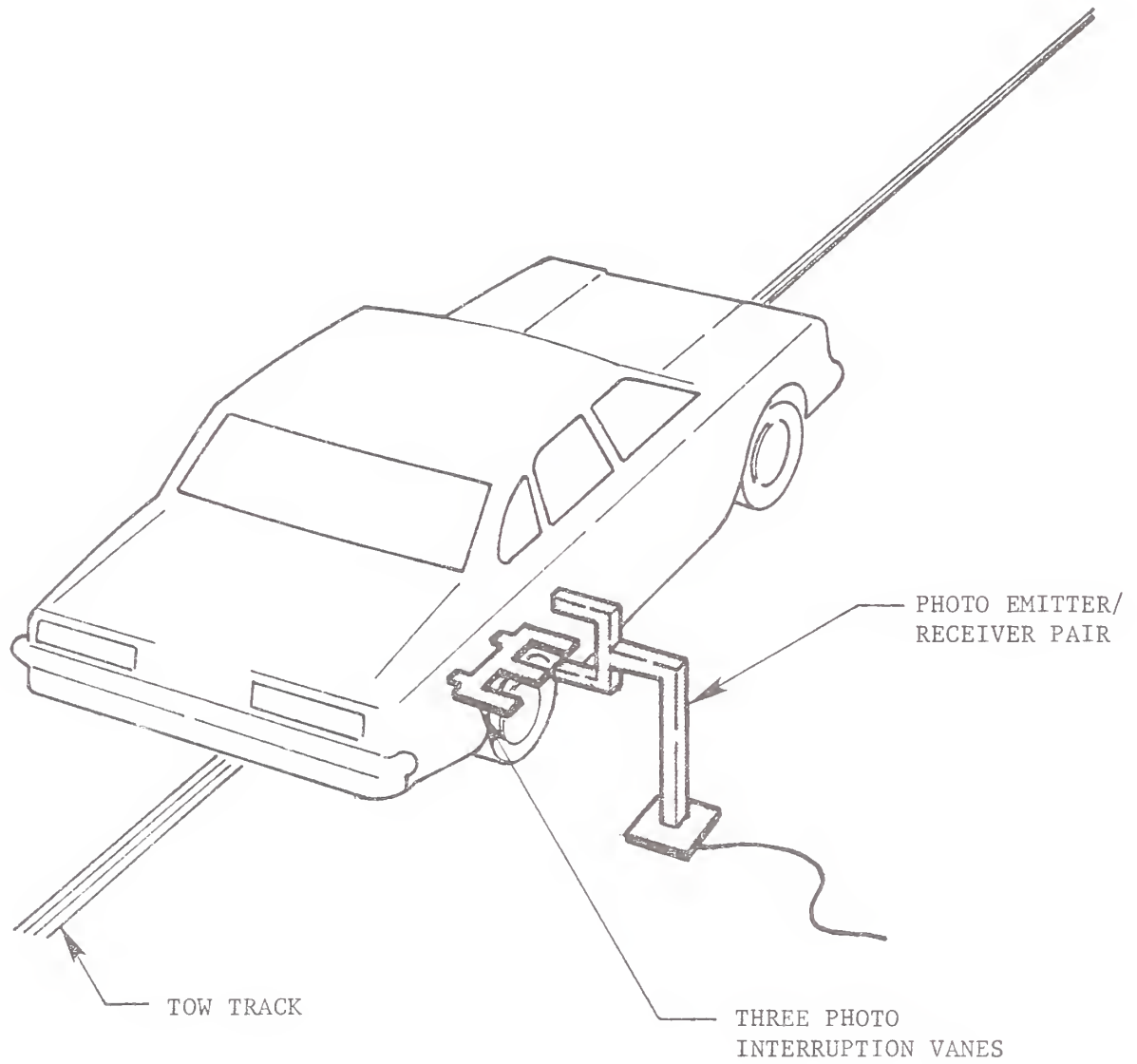
GLAZING DAMAGE:

Left side windows shattered, windshield cracked on
driver's side.

OTHER NOTABLE IMPACT EFFECTS:

*The driver's door was to remain closed for subsequent door opening effort studies.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.

The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight*} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2060 + 2 \times 174 + 135 \text{ lbs.} \\ &= 2543 \text{ lbs.}\end{aligned}$$

To achieve test weight, the battery, starter and alternator were removed and 2.0 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadometer.

$$\begin{aligned}\text{*Unloaded Delivered Weight} &= \text{Measured Weight} + \text{Estimated 10 Gallons Fuel} \\ &= 2000 + 60 \text{ lbs} \\ &= 2060 \text{ lbs}\end{aligned}$$

TEST ANOMALIES

Data from the passenger's redundant lower left rib, LLRYGC, was lost due to a faulty accelerometer.

There was a loose connection to the left front door accelerometer in Position 11, LFDYG5. See the following o'graph.

CHANNEL LFYD5

→

→

SECTION 3.0
DATA REQUIRED BY R & D

The following pages are included in this section:

1. Dummy temperature control and position data
2. Dummy kinematic summary
3. Vehicle crush data
4. Dummy and vehicle accelerometer location and data summary
5. High speed camera information
6. Transducer information

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately 1 minute prior to the test.

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

DUMMY PLACEMENT AND POSITIONING

SIDE IMPACT DUMMY

DRIVER DSP

REAR PASSENGER DSP

HEAD Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.

Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.

UPPER TORSO Placed against seat back. Midsagittal plane is vertical and centered on bucket seat.

Placed against seat back. Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.

LOWER TORSO Midsagittal plane is vertical and centered on bucket seat.

Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.

UPPER LEGS (thighs or femurs) Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.

Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.

KNEES Knees set 14.5" apart between pivot bolt head outer surfaces. Outer surface of right knee pivot bolt is 8.6" from midsagittal plane of dummy. Outer surface of left knee pivot bolt is 5.9" from midsagittal plane of dummy.

Located so that planes defined by femur and tibia centerlines are as close as possible to vertical.

LOWER LEGS Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.

Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.

RIGHT FOOT Placed on undepressed accelerator pedal -- rearmost point of heel on floorplan in plane of pedal.

Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

LEFT FOOT Placed on toeboard -- rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan. Centerline falls in vertical longitudinal plane.

Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

*NOTE: THE SIDE IMPACT DUMMY DOES NOT INCLUDE ARMS.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

VEHICLE NHTSA NO. R&D

MFR./MAKE/MODEL: Volkswagen Rabbit

FRONT SEAT TYPE: BENCH
 X BUCKET
 SPLIT BENCH

ADJUSTER TYPE: X MANUAL
 POWER

BUCKET SEAT BACK TYPE: FIXED
 X ADJUSTABLE

TECHNICIANS:

1. N. Echeverria
2. B. Fishbaugh
3. B. Miller

POSITIONING DATE: 10/8/84

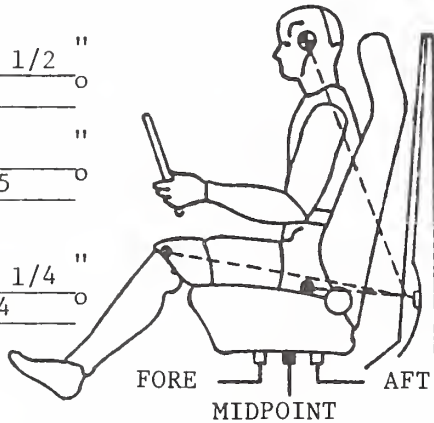
AMBIENT TEMP.: 70° F. TIME: 8:50

DRIVER DUMMY # 06

HEAD 20 1/2 "
 TARGET*23 °

KNEE 32 "
 JOINT 105 °

APPROX.
 "H" 18 1/4 "
 POINT 124 °

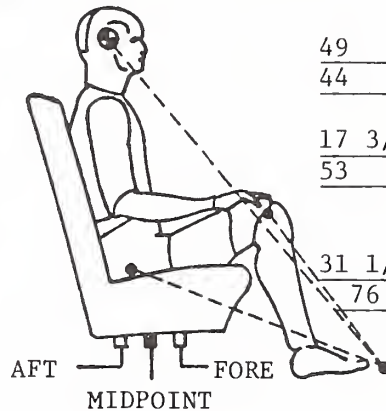


REAR PASSENGER DUMMY # U02

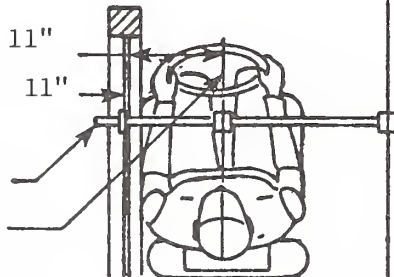
49 "HEAD
44 °TARGET**

17 3/4 "KNEE
53 °JOINT

APPROX.
31 1/4 " "H"
76 °POINT



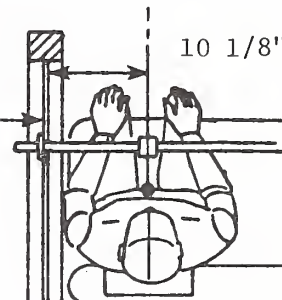
DOOR
 GLASS
 HEIGHT***



LATERAL BAR
 ADJUSTABLE
 POINTER

DRIVER
 DUMMY #
 06

DOOR
 GLASS
 HEIGHT DNA 10 1/8"

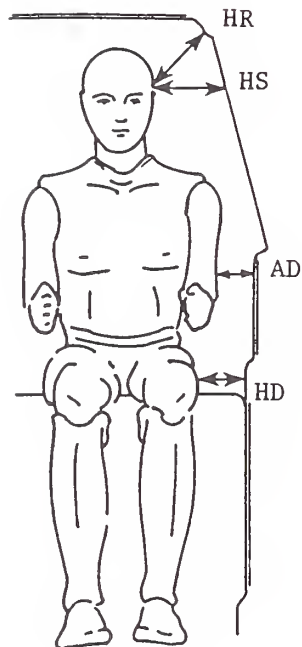
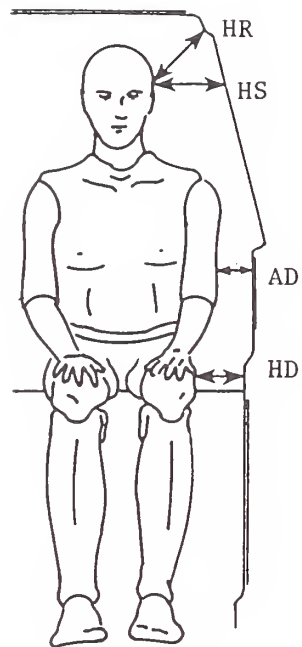


PASSENGER
 DUMMY #
 U02

*All driver dummy dimensions referenced to top of striker bolt and all angles referenced to vertical.

**All passenger dummy dimensions referenced to front seat back latch bolt with front seat in mid-position and all angles referenced to vertical.

***Door glass height is equal on the right and left side of vehicle at dummy nose level.



DRIVER
06

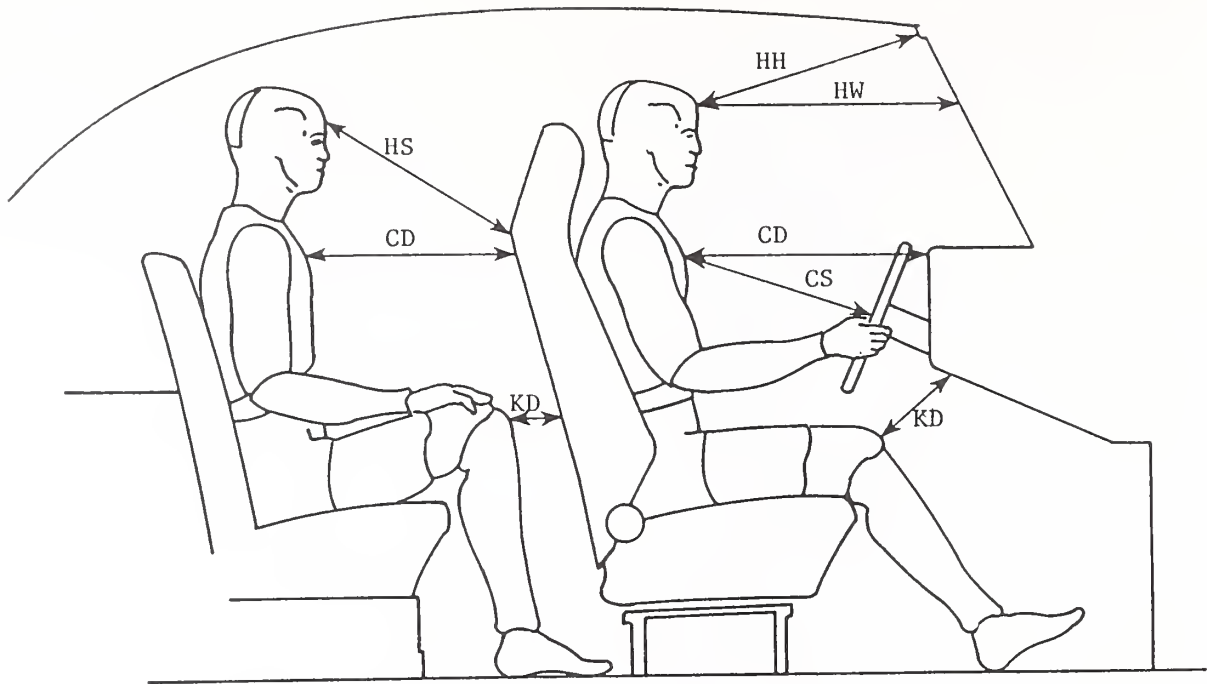
PASSENGER
U02

HR	6 3/8	3 3/4*
HS	7 1/2	6 1/2
AD	1*	0*
HD	2 1/2*	2 1/4*

ALL MEASUREMENTS IN INCHES

*Measurements were made from the dummy to the modified padding.

DUMMY LATERAL CLEARANCE DIMENSIONS



DRIVER

PASSENGER

06

U02

HH	12 1/16	DNA
HW	17 3/4	DNA
HS	DNA	23
CD	18 7/8	17 3/8
CS	11 9/16	DNA
KDL	4 3/4	4 1/2
KDR	4 7/16	5 5/16

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dash panel below the steering column burst inward, hitting the dummy's knees. The left hip of the dummy contacted the inner panel as the door caved in. As the buttocks swung to the right, the dummy's left shoulder and chest contacted the window sill and door panel. The head went outside the vehicle's boundaries and struck the left pillar of the barrier. Travelling to the right side of the car, buttocks first, the dummy lifted, hitting the roof with the length of the back. On rebound the driver twisted towards the left, striking the top of the passenger seat with the rib cage. The dummy then rocked back towards the driver's side of the car with the head and shoulders between the front seats facing the rear. Final resting position showed the driver with the buttocks in the front passenger window and the torso leaning left. The head remained between the two front seats, extending into the rear compartment.

PASSENGER

During impact, the left rear quarter panel caved in, striking the passenger's hip. As the knees twisted towards the right the dummy's torso leaned left. The passenger's head then hit the left rear side header and continued travelling outside the vehicle, striking the front barrier plate. The dummy came to rest with the head outside the vehicle, the torso leaning left and the knees swung to the right.

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	6	0	6	12	18	24	30	36	42	48	54	60	66	72	78
		PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	11.5	X	X	20.1	19.9	19.9	19.9	19.9	20.0	20.0	20.1	20.2	20.2	20.3	X	X
H-Point	23.3	X		18.0	17.9	17.9	17.8	17.8	17.8	17.9	17.9	18.0	18.0	18.1	18.3	X
Mid Door	24.5			16.7	18.0	17.8	17.8	17.8	17.8	17.8	17.8	17.9	17.9	18.0	18.2	17.4
Window Sill	35.0			20.3	19.9	19.8	19.6	19.5	19.4	19.4	19.5	19.5	19.6	19.8	19.8	20.0
Window Top	54.5	X	X	X	X	X	27.5	27.2	27.1	27.1	27.1	27.2	27.3	27.5	27.7	28.0

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Axle Height	11.5	X	X	20.5	25.9	27.3	28.2	28.3	28.5	28.8	35.4	32.5	29.1	25.1	X	X
H-Point	23.3	X		22.0	22.0	39.9	40.9	39.9	39.8	39.1	38.5	37.2	***	33.1	30.3	27.1
Mid Door	24.5			20.3	21.9	21.5	39.0	39.1	38.9	38.4	37.5	36.8	***	33.4	30.5	27.1
Window Sill	35.0			20.4	20.3	20.3	32.0	34.2	33.1	31.2	29.9	29.8	***	29.7	25.4	22.1
Window Top	54.5	X	X	X	X	X	27.5	27.3	27.1	27.1	27.1	27.1	27.3	27.4	27.6	28.0

STATIC CRUSH (IN)

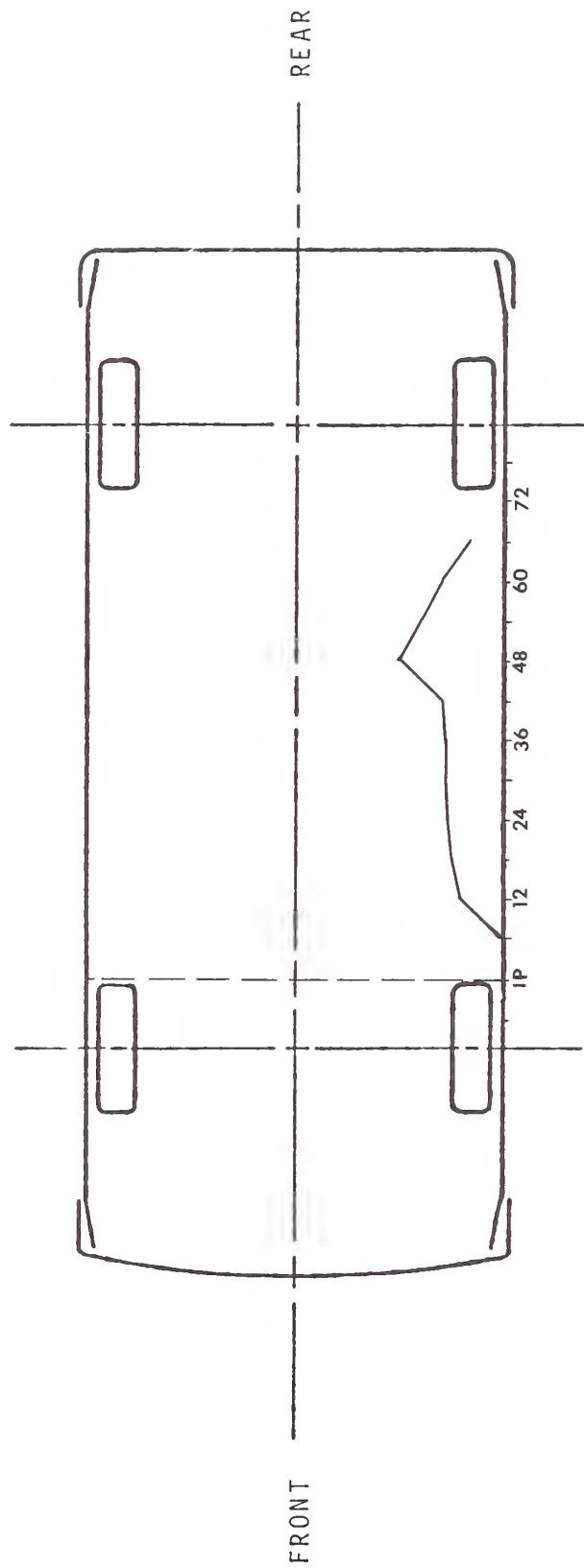
Axle Height	11.5	X	X	0.4	6.0	7.4	8.3	8.4	8.5	8.8	15.3	12.3	8.9	4.8	X	X
H-Point	23.3	X		4.0	4.1	22.0	23.0	22.1	22.0	21.3	19.1	19.3	***	15.1	12.2	8.8
Mid Door	24.5			3.6	3.9	3.7	21.1	21.3	21.1	20.6	19.7	19.0	***	15.5	12.5	8.9
Window Sill	35.0			0.1	0.4	0.5	12.4	14.7	13.7	11.8	10.5	10.4	***	10.1	5.6	2.3
Window Top	54.5	X	X	X	X	X	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0

* Projected impact point is 37 inches forward of driver's side wheelbase midpoint. Column readings are front to rear from left to right.

** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

*** Data point was not available following test.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

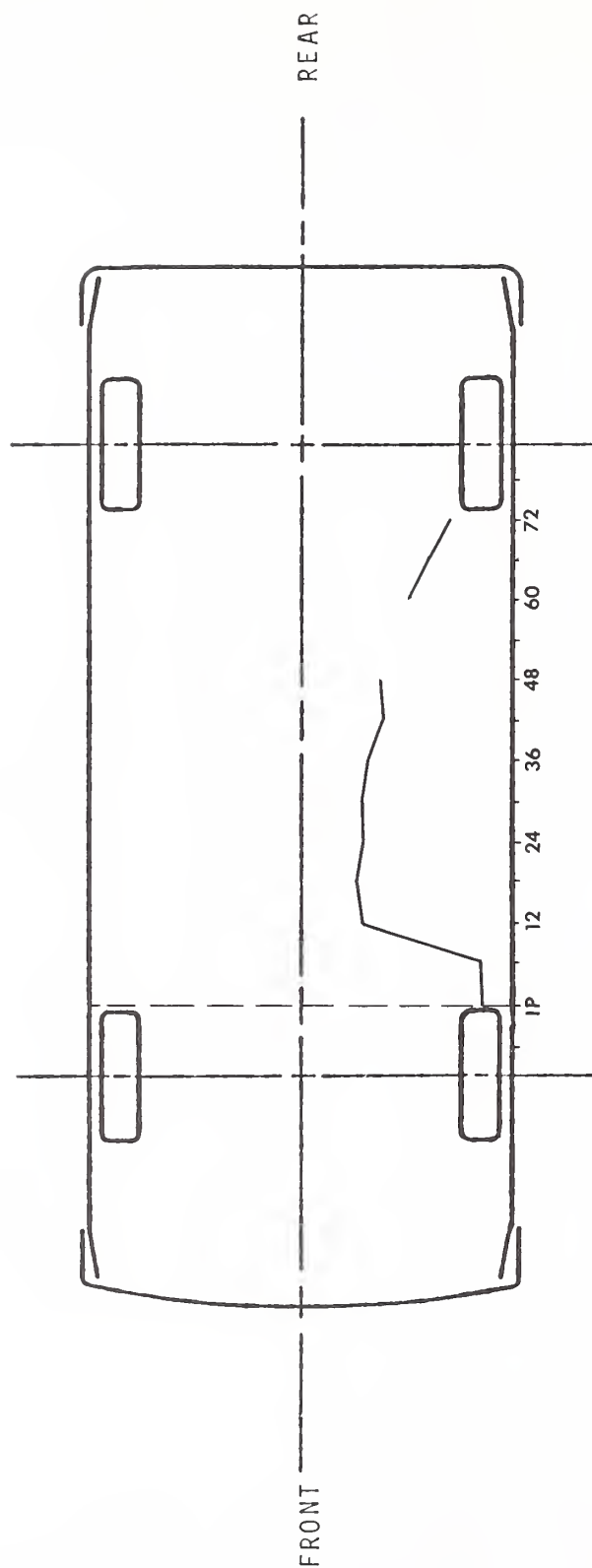
Length of Car = 154.5"

Width of Car = 63.4"

Maximum Crush = 15.3"

Approximate Length of Crush = 60.0"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

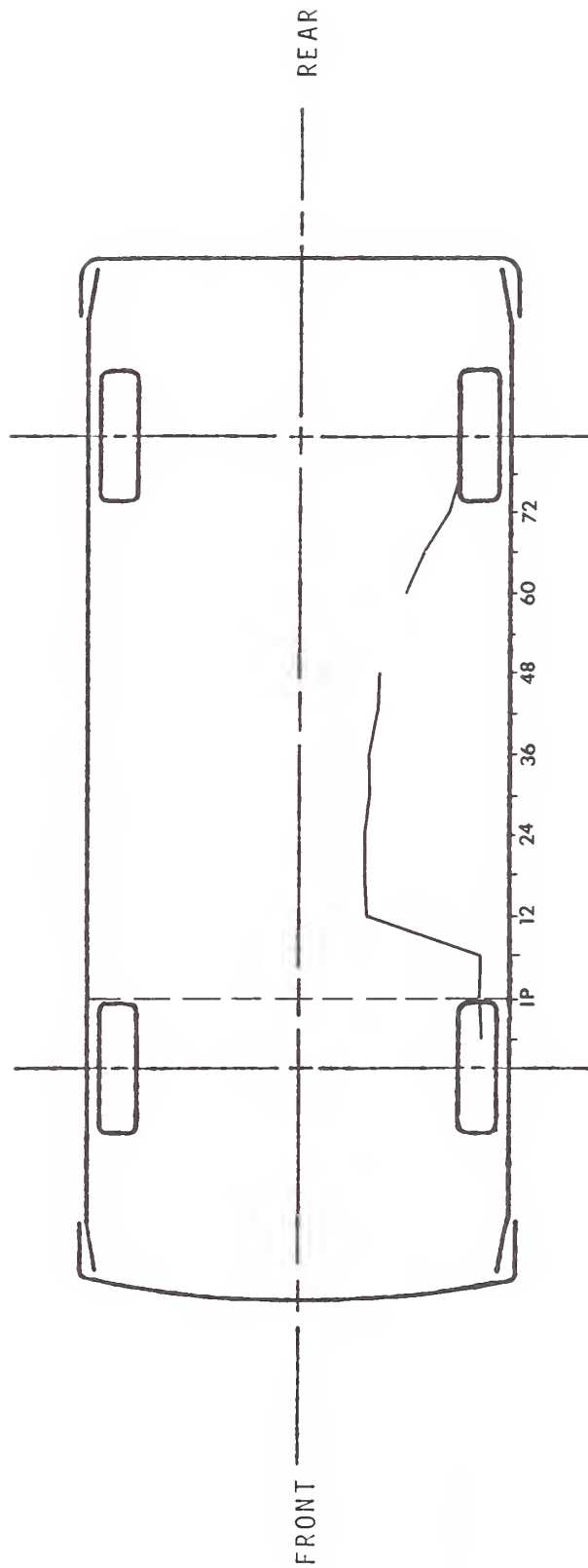


PROFILE LEVEL EQUALS H-POINT HEIGHT
 IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.5"
 Width of Car = 63.4"

Maximum Crush = 23.0"
 Approximate Length of Crush = 72.0"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

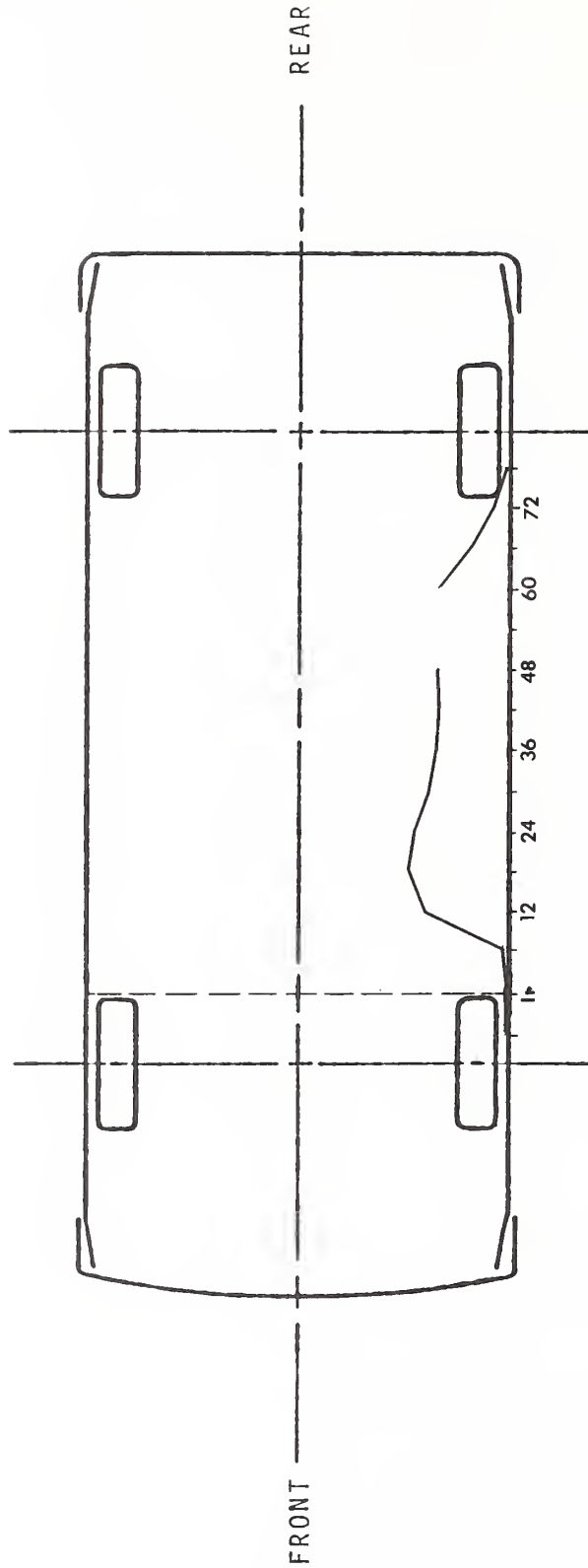


PROFILE LEVEL EQUALS MID-DOOR HEIGHT
 IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.5"
 Width of Car = 63.4"

Maximum Crush = 21.3"
 Approximate Length of Crush = 84"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

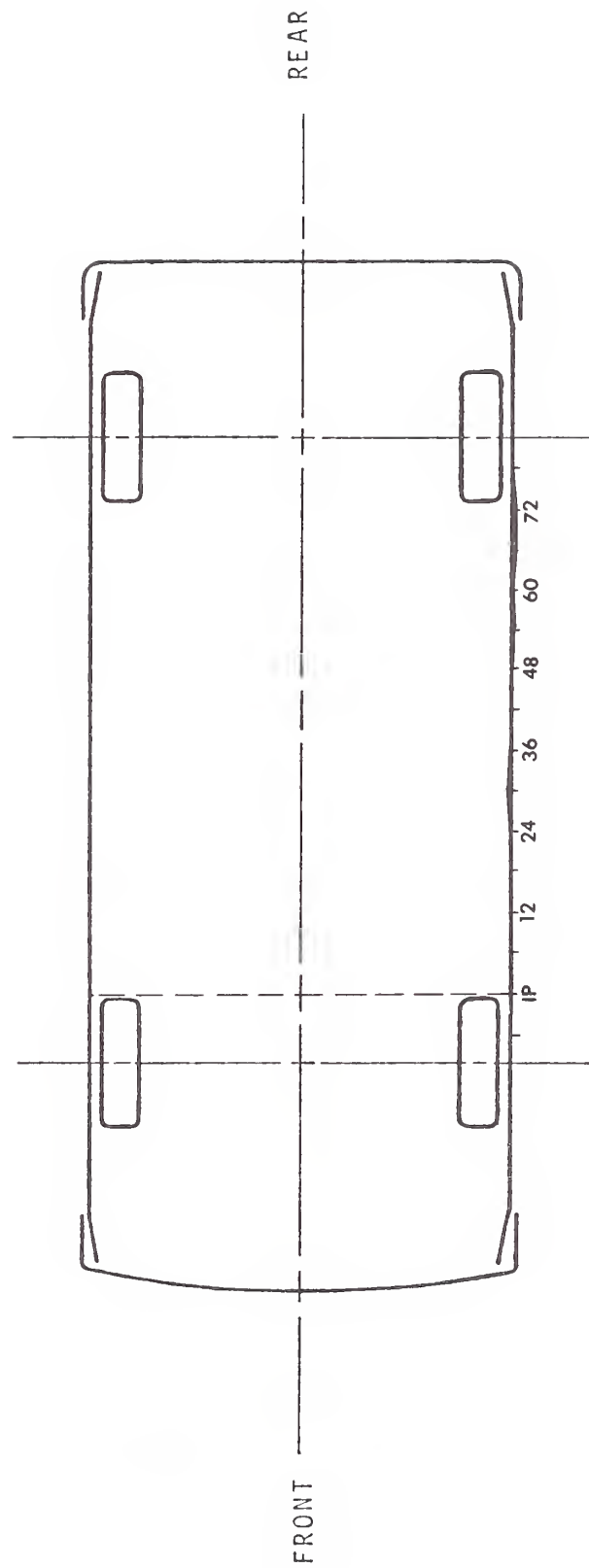
Length of Car = 154.5"

Maximum Crush = 14.7"

Width of Car = 63.4"

Approximate Length of Crush = 84"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.5"
Width of Car = 63.4"

Maximum Crush = .1"
Approximate Length of Crush = 54"

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE		NEGATIVE		POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**		DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
	(g)	(msec)	(g)	(msec)	(g)	(msec)	(g)	(msec)
HEAD ACCELERATION								
LONGITUDINAL	---	--- δ	---	--- δ	123.20	243.00	32.47	76.75
LATERAL	---	--- δ	---	--- δ	58.47	79.88	37.46	243.13
VERTICAL	---	--- δ	---	--- δ	45.87	87.75	60.74	75.88
RESULTANT				δ		133.14 @	243.00	
HIC	---	---	---	δ	590.61	from 70.50 to 99.50		
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	34.93	99.37	57.64	83.75	5.85	151.25	37.52	94.38
LATERAL (P)***	93.19	52.50	43.03	45.00	67.58	78.75	4.49	69.38
LATERAL (R)***	98.34	52.50	42.90	45.00	69.90	78.75	5.79	68.75
VERTICAL	32.72	41.25	26.48	47.50	11.85	65.00	28.69	84.38
RESULTANT (P)		94.95 @	52.50			75.52 @	79.38	
RESULTANT (R)		100.02 @	52.50			77.81 @	79.38	
DELTA V (MPH)****		22.0 @	103.75 (P)			25.6 @	151.25 (P)	
		25.6 @	104.38 (R)			26.7 @	150.62 (R)	
LOWER SPINE								
LONGITUDINAL	25.54	55.00	27.46	90.62	14.18	85.00	36.08	70.63
LATERAL (P)	114.19	46.25	27.30	82.50	102.78	71.88	26.45	95.63
LATERAL (R)	116.25	46.25	26.57	82.50	103.32	71.88	24.99	95.63
VERTICAL	34.37	41.87	13.74	80.63	31.76	75.00	13.81	100.63
RESULTANT (P)		115.20 @	46.25			109.62 @	71.88	
RESULTANT (R)		117.24 @	46.25			110.13 @	71.88	
DELTA V (MPH)		30.7 @	67.50 (P)			30.0 @	90.62 (P)	
		32.2 @	68.13 (R)			31.6 @	91.25 (R)	
LEFT UPPER RIB								
LATERAL (P)	83.14	46.88	37.93	52.50	56.88	85.00	2.81	53.75
LATERAL (R)	90.63	47.50	42.71	52.50	53.61	85.00	1.45	53.75
DELTA V (MPH)		---	@ --- δ			35.2 @	132.50 (P)	
		---	@ --- δ			35.1 @	132.50 (R)	
LEFT LOWER RIB								
LATERAL (P)	63.18	55.63	21.28	90.00	88.39	76.88	1.92	51.25
LATERAL (R)	70.97	47.50	22.81	101.25	---	--- Y	---	--- Y
DELTA V (MPH)		32.6 @	83.75 (P)			34.9 @	118.75 (P)	
		34.3 @	83.13 (R)			---	@ --- Y	
PELVIS ACCELERATION								
LONGITUDINAL	17.41	95.50	80.41	42.88	17.42	97.00	72.18	68.75
LATERAL	271.94	41.25	57.56	29.00	209.77	67.88	20.19	53.25
VERTICAL	79.02	40.75	16.20	28.75	53.40	70.50	8.69	63.75
RESULTANT		286.86 @	41.25			220.41 @	68.00	
DELTA V (MPH)		35.2 @	82.50			36.6 @	89.13	

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	<u>DRIVER DUMMY</u>				<u>PASSENGER DUMMY</u>			
	<u>POSITIVE</u> <u>DIRECTION*</u>		<u>NEGATIVE</u> <u>DIRECTION**</u>		<u>POSITIVE</u> <u>DIRECTION*</u>		<u>NEGATIVE</u> <u>DIRECTION**</u>	
	<u>MAX</u> <u>(in)</u>	<u>TIME</u> <u>(msec)</u>	<u>MAX</u> <u>(in)</u>	<u>TIME</u> <u>(msec)</u>	<u>MAX</u> <u>(in)</u>	<u>TIME</u> <u>(msec)</u>	<u>MAX</u> <u>(in)</u>	<u>TIME</u> <u>(msec)</u>
RIB DEFLECTION †	0.77	83.63	0.15	52.00	0.93	100.38	0.14	51.88

* LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD

**LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: DOWNWARD

*** (P) = Primary Sensor, (R) = Redundant Sensor

**** For dummy channels, Delta V is the velocity change at the approximate time of separation from the contact area.

† Compression: Positive

δ See Data Plots

γ See TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT SILL AT FRONT SEAT (LONGITUDINAL)	83.5	23.6	9.0				
	(LATERAL)				0.56	133.00	8.09	102.25
	(VERTICAL)				19.44	71.75	5.46	64.63
	(RESULTANT)				6.31	86.13	7.78	45.88
						20.73 @ 71.75		
2	RIGHT SILL AT REAR SEAT (LONGITUDINAL)	61.6	23.6	10.5				
	(LATERAL)				1.23	132.38	6.64	103.00
	(VERTICAL)				21.16	83.25	4.17	145.00
	(RESULTANT)				5.96	86.88	6.40	45.13
						21.72 @ 83.50		
3	REAR DECK OVER AXLE (LONGITUDINAL)	32.0	0.0	7.5				
	(LATERAL)				5.23	113.13	20.64	64.50
	(VERTICAL)				27.04	79.50	3.44	146.25
	(RESULTANT)				11.77	52.50	21.22	65.88
						36.03 @ 65.38		
4	LEFT SILL AT REAR SEAT (LATERAL)	61.4	-23.8	10.8				
					52.14	86.25	67.55	92.50
5	LEFT SILL AT FRONT SEAT (LATERAL)	83.5	-23.3	9.5				
					49.56	49.63	37.42	75.25
6	LEFT FRONT DOOR CENTERLINE (LATERAL)	80.8	-25.9	23.1				
					106.70	51.38	103.20	44.63
7	RIGHT REAR COMPARTMENT (LONGITUDINAL)	31.0	16.0	14.8				
					3.76	131.38	8.90	69.63
8	MIDREAR OF LEFT FRONT DOOR (LATERAL)	61.0	-25.8	23.3				
					95.08	33.63	56.56	68.50
9	UPPER LEFT FRONT DOOR CENTERLINE (LATERAL)	82.0	-25.8	32.3				
					107.25	51.13	85.41	58.88
10	MIDFRONT OF LEFT FRONT DOOR (LATERAL)	99.2	-25.8	22.1				
					165.00	12.88	121.12	31.25
11	UPPER REAR OF LEFT REAR DOOR (LATERAL)	70.9	-25.9	32.6				
					---	--- Y	---	--- Y

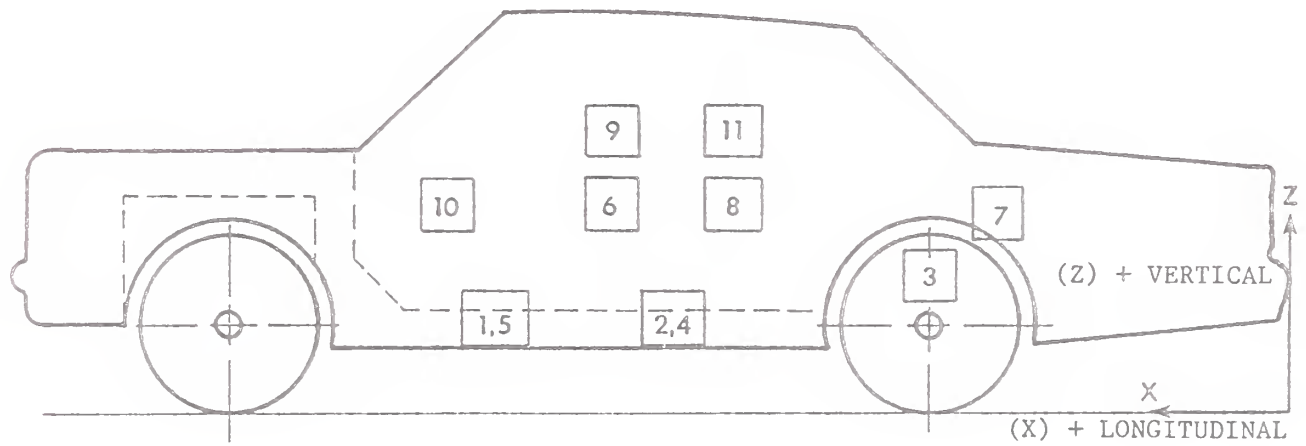
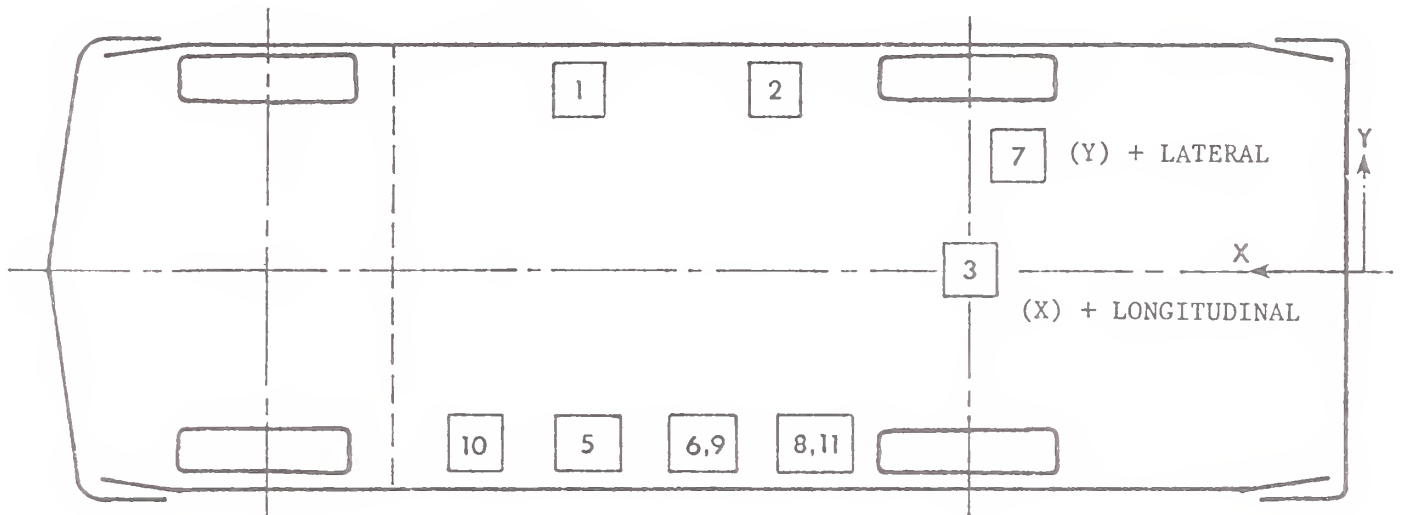
* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right),
Z - Ground Level (+ Up)

All measurements of accelerometer locations in inches.

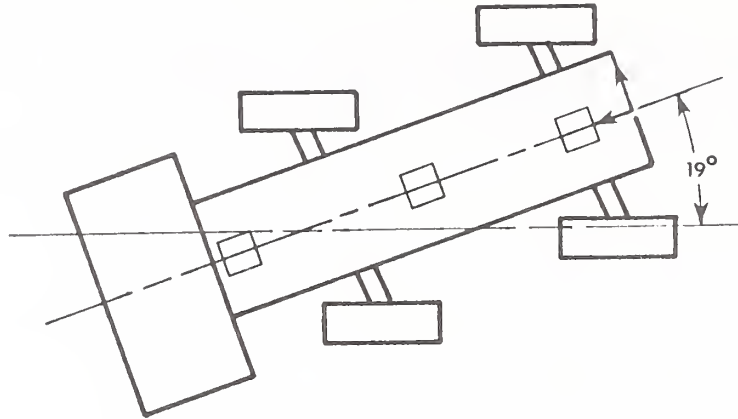
Y See TEST ANOMALIES

τ This Delta V appears unrealistic.

VEHICLE ACCELEROMETER LOCATIONS



MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	CENTER OF GRAVITY	74.5	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -18.2 \text{ mph @ } 149.88 \text{ msec}$			---	--- ^x	13.75	73.88
	(LATERAL)	$\Delta V = -4.1 \text{ mph @ } 149.88 \text{ msec}$			1.87	145.63	5.81	101.75
	(VERTICAL)				21.37	102.50	13.37	55.75
	(RESULTANT)					22.94 @	102.38	
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	$\Delta V = -20.5 \text{ mph @ } 149.88 \text{ msec}$			---	--- ^x	13.65	74.00
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -16.7 \text{ mph @ } 149.88 \text{ msec}$			0.32	140.00	13.21	71.63

* Reference: X - Rear Most Point of Frame (+ To Forward), Y - Barrier Centerline (+ To Right), Z - Ground Level (+ To Up)

All measurements of accelerometer locations in inches.

^x There were no positive values in the time interval of interest.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead	Photosonic 1B	8	493	Vehicle dynamics
2	Overhead	Photosonic 1B	25	498	Close-up of impact point
3	Onboard MDB	Photosonic 1B	25	498	Close-up of impact point
4	Onboard MDB	Stalex	13	500	Driver kinematics
5	Ground level - right	Photosonic 1B	25	500	Overall view
6	Ground level - left	Photosonic 1B	17	493	Overall view
7	Onboard vehicle	Photosonic 1B	8	805	Driver kinematics - front view
8	Onboard vehicle	Photosonic 1B	8	807	Driver kinematics
9	Onboard vehicle	Photosonic 1B	8	800	Passenger kinematics

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM.
 (24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH
 AND CRASH EVENT SPLICED AT START AND END OF FILM.

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	0	0	25'
2	0	0	25'
5	26'4"	60'	45"
6	-19'7"	-11'3"	45"

Origin of Coordinate System is Point of Impact

+X = Forward with Respect to Striking Vehicle's Velocity Vector
+Y = Rightward with Respect to Striking Vehicle's Velocity Vector
+Z = Upward with Respect to Striking Vehicle's Velocity Vector

NON-GOVERNMENT FURNISHED TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NUMBER	SERIAL NUMBER	MFGR.	DATE OF LAST CALIBRATION	SENSITIVITY	DESIRED FULL SCALE (ENGR. UNITS)
BCXG	Accel	4-202-0001	18845	Bell Howell	5/2/84	0.237 MV/G	50 G
BCYG	Accel	4-202-0001	18858	Bell Howell	5/2/84	0.236 MV/G	50 G
BCZG	Accel	4-202-0001	18857	Bell Howell	5/2/84	0.239 MV/G	50 G
BFCXG	Accel	4-202-0001	18240	Bell Howell	5/2/84	0.239 MV/G	50 G
BRCXG	Accel	4-202-0001	19022	Bell Howell	5/2/84	0.220 MV/G	50 G

All dummy and struck vehicle accelerometers were Government Furnished Equipment and were Endevco 2264 Accelerometers.

APPENDIX A
PHOTOGRAPHS



Figure A-1. PRE-TEST OVERALL - VIEW 1



Figure A-2. PRE-TEST OVERALL - VIEW 2
A-2



Figure A-3. PRE-TEST OVERALL - VIEW 3



Figure A-4. PRE-TEST OVERALL - VIEW 4
A-3



Figure A-5. PRE-TEST CLOSEUP - VIEW 1

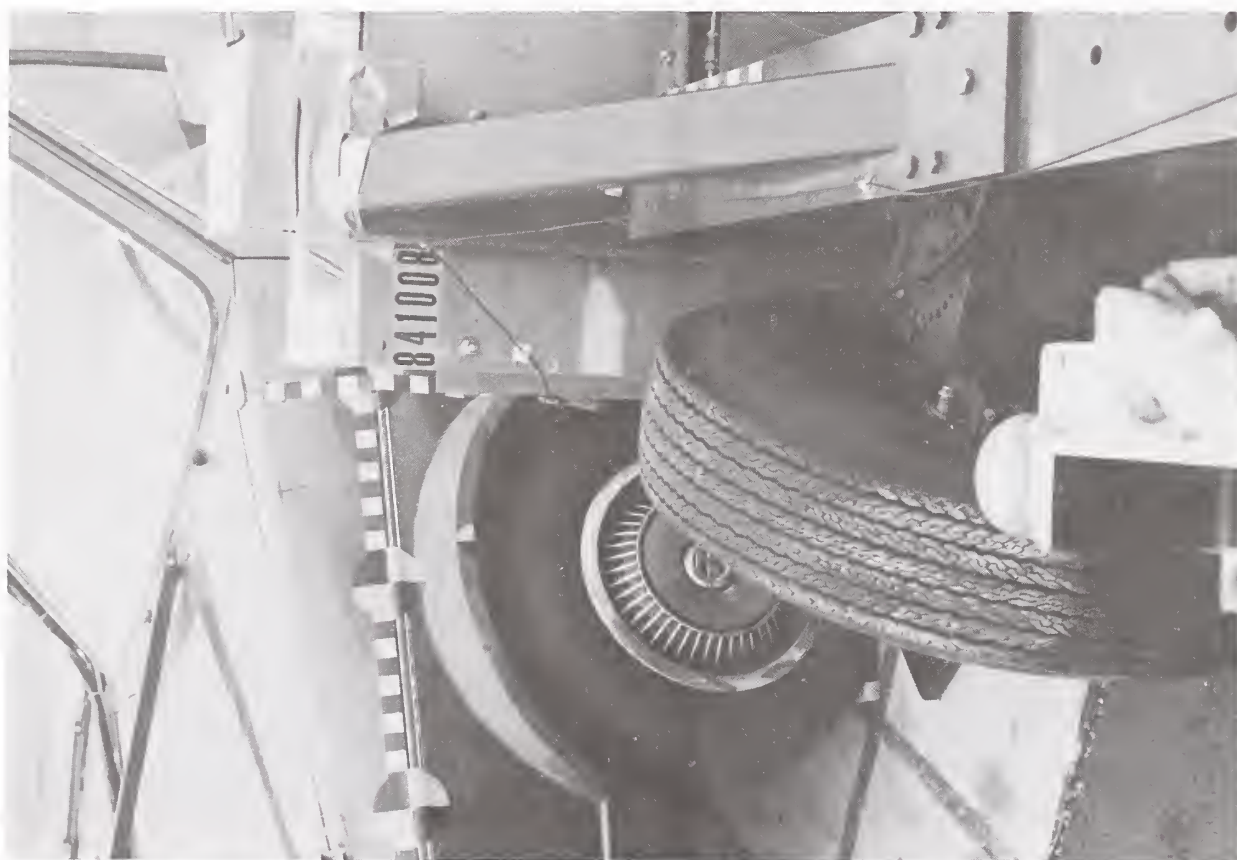


Figure A-6. PRE-TEST CLOSEUP - VIEW 2
A-4



Figure A-7. PRE-TEST CLOSEUP - VIEW 3



Figure A-8. PADDING MODIFICATIONS
A-5



Figure A-9. PRE-TEST DRIVER DUMMY - VIEW 1

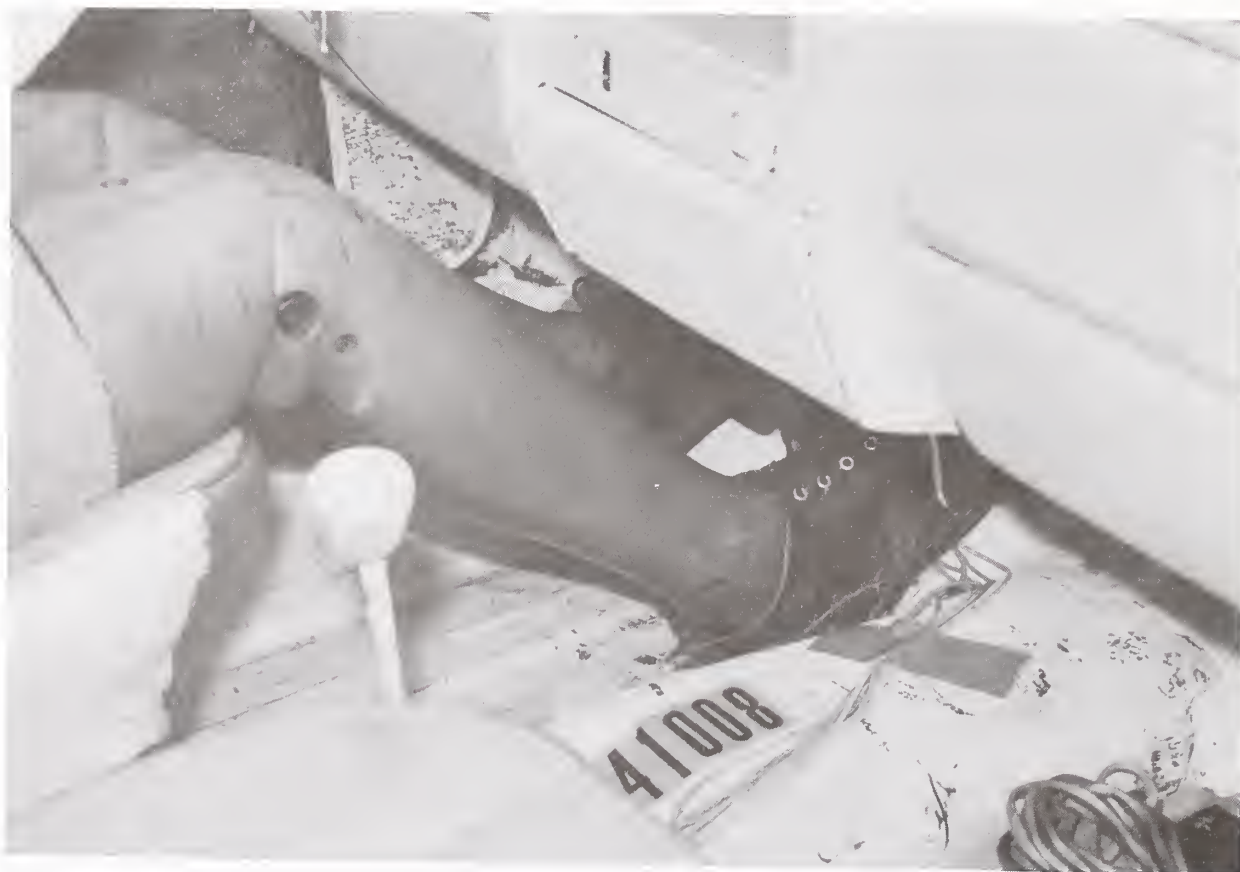


Figure A-10. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-11. PRE-TEST PASSENGER DUMMY - VIEW 1



Figure A-12. PRE-TEST PASSENGER DUMMY - VIEW 2
A-7



Figure A-13. CRASH EVENT PHOTOGRAPH



Figure A-14. POST-TEST OVERALL - VIEW 1
A-8



Figure A-15. POST-TEST OVERALL - VIEW 2



Figure A-16. POST-TEST OVERALL - VIEW 3
A-9



Figure A-17. POST-TEST OVERALL - VIEW 4



Figure A-18. POST-TEST DRIVER DUMMY - VIEW 1
A-10



Figure A-19. POST-TEST DRIVER DUMMY - VIEW 2



Figure A-20. POST-TEST PASSENGER DUMMY - VIEW 1



Figure A-21. POST-TEST PASSENGER DUMMY - VIEW 2



Figure A-22. POST-TEST DUMMIES OVERALL
A-12



Figure A-23. POST-TEST VEHICLE DAMAGE - VIEW 1

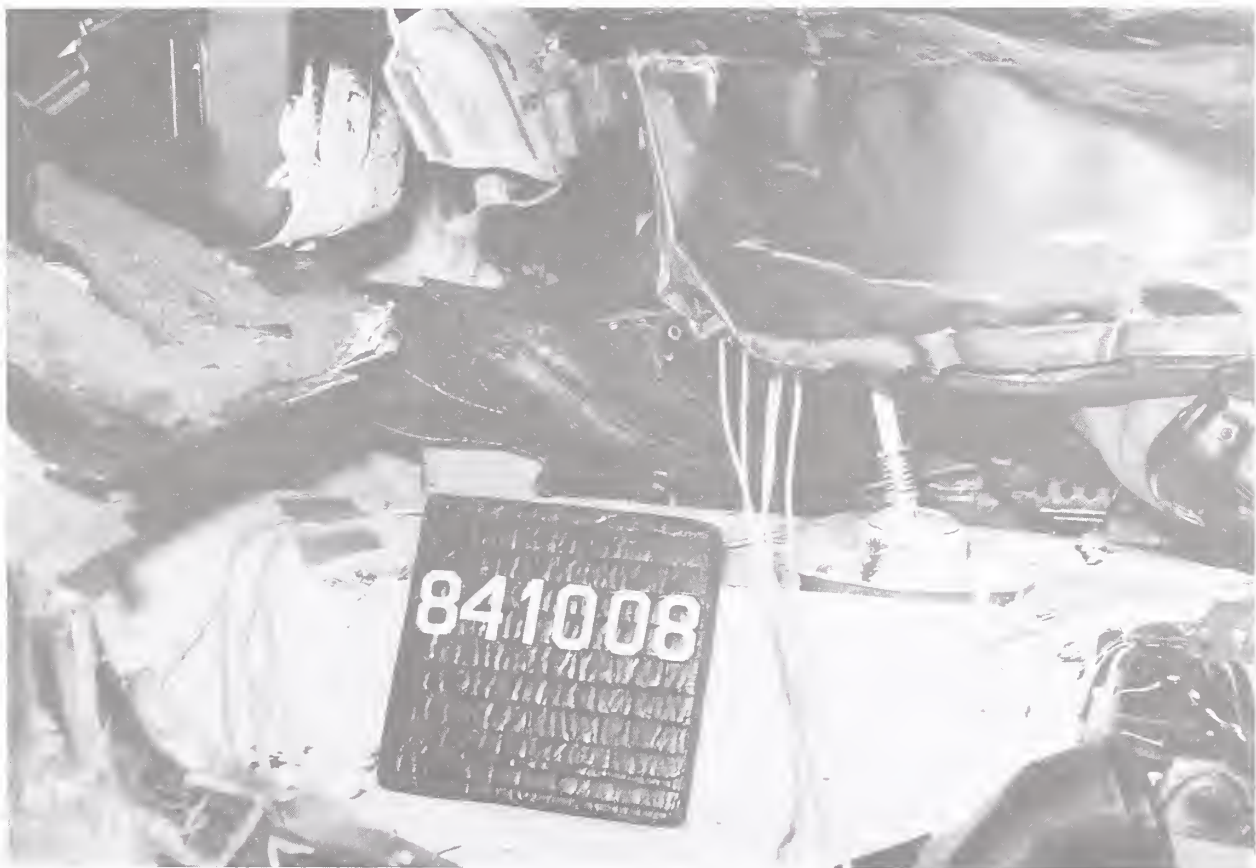


Figure A-24. POST-TEST VEHICLE DAMAGE - VIEW 2
A-13



Figure A-25. POST-TEST VEHICLE DAMAGE - VIEW 3

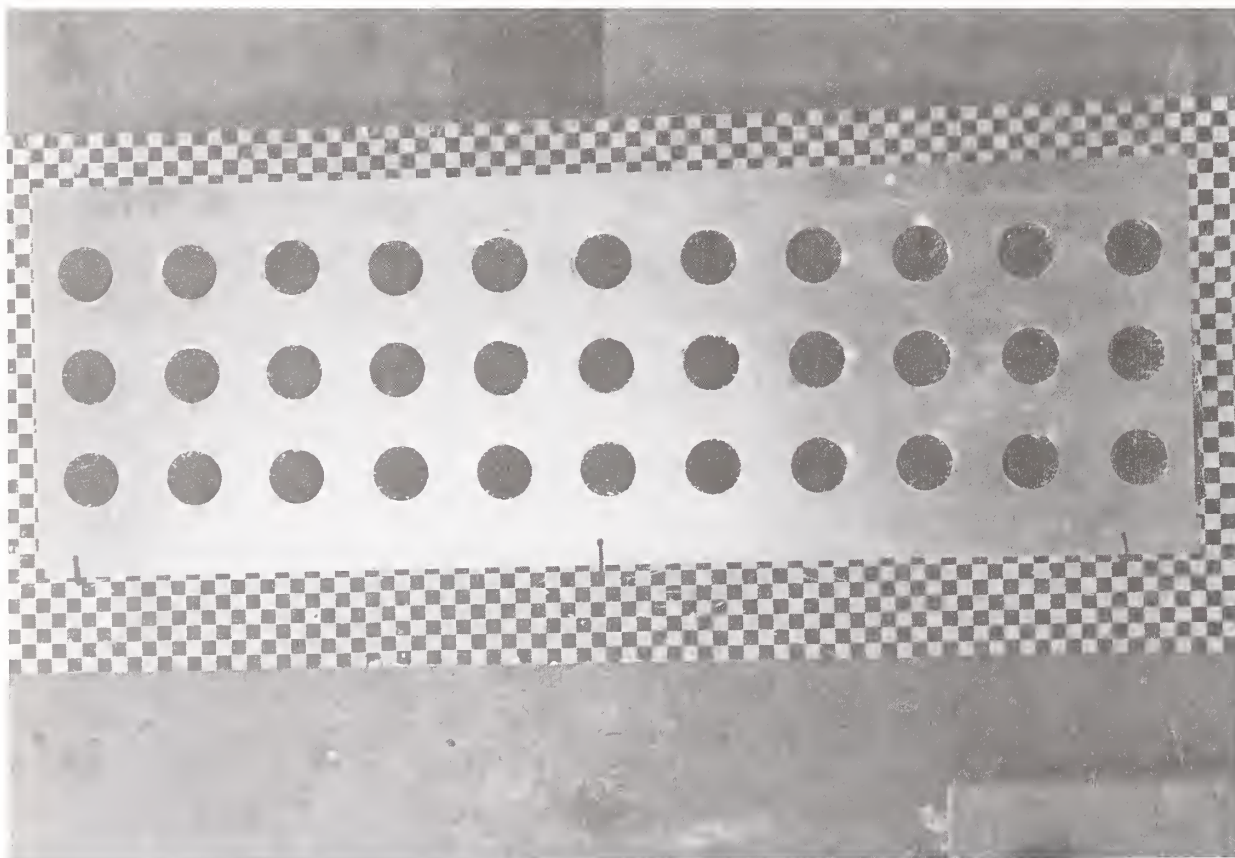


Figure A-26. PRE-TEST MDB FACE - VIEW 1
A-14

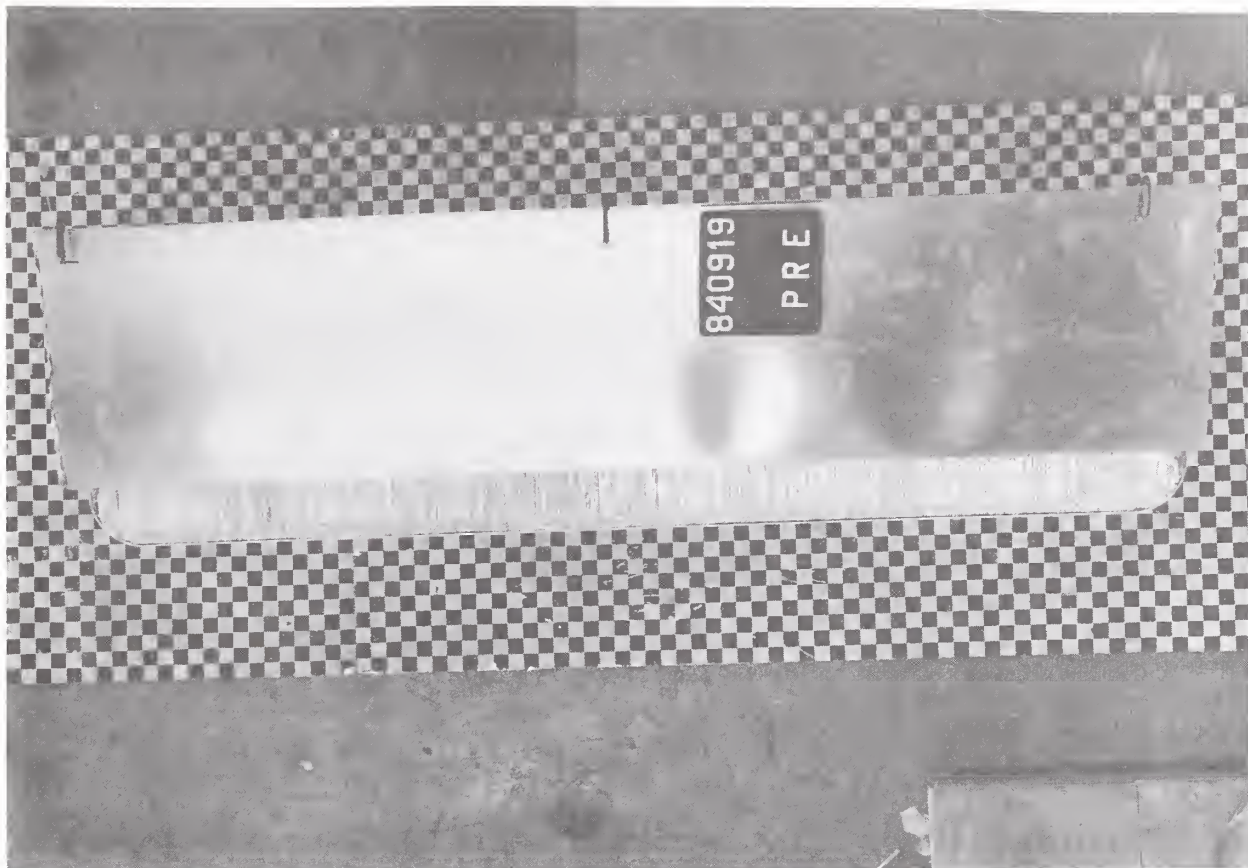


Figure A-27. PRE-TEST MDB FACE - VIEW 2

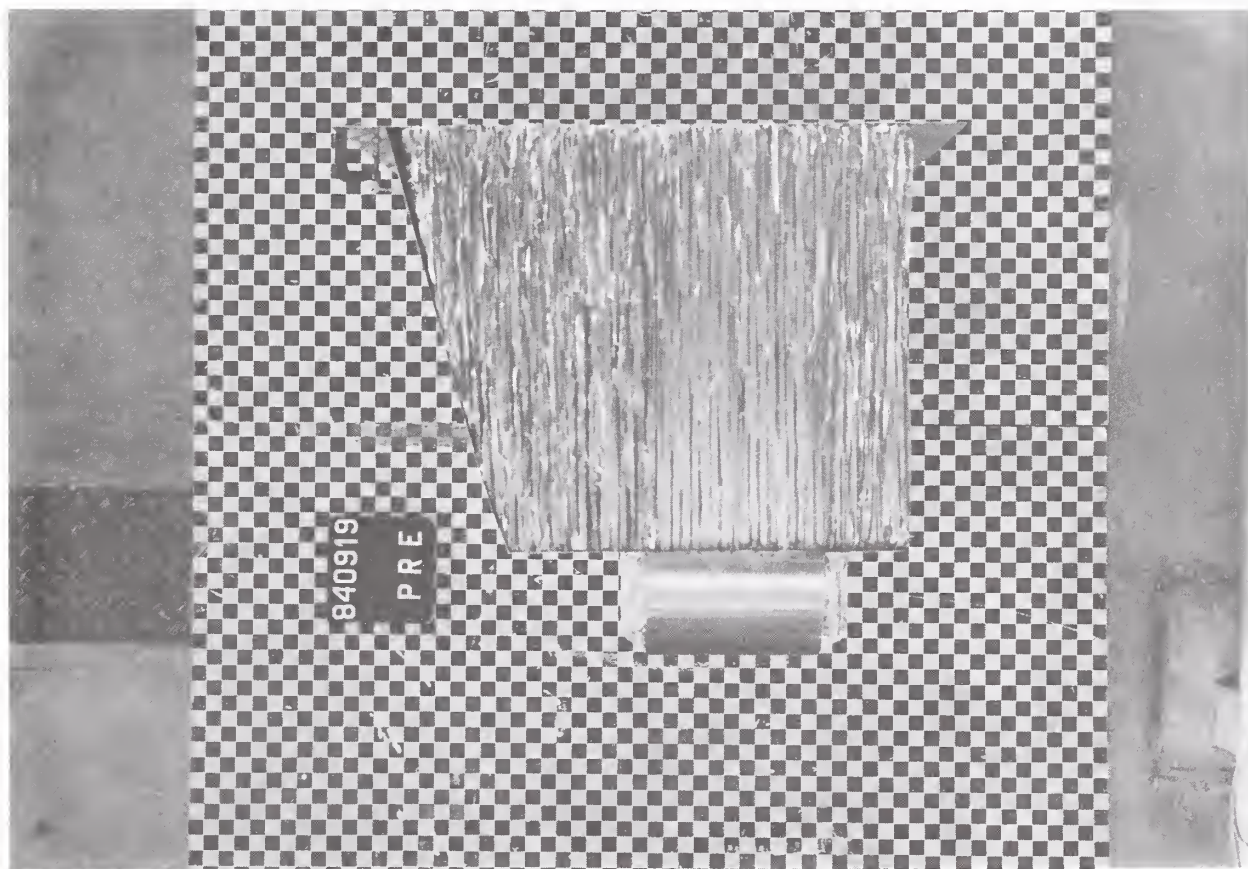


Figure A-28. PRE-TEST MDB FACE - VIEW 3
A-15

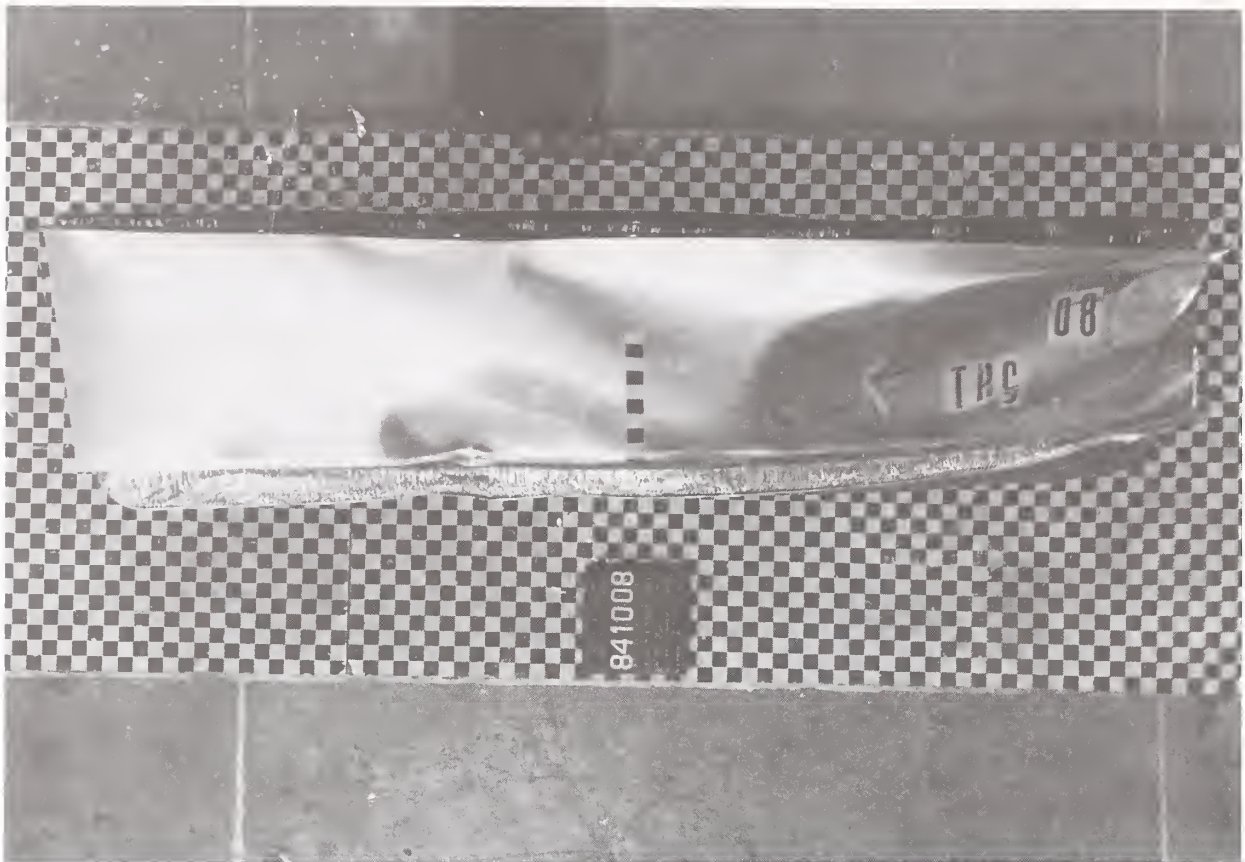


Figure A-29. POST-TEST MDB FACE - VIEW 1

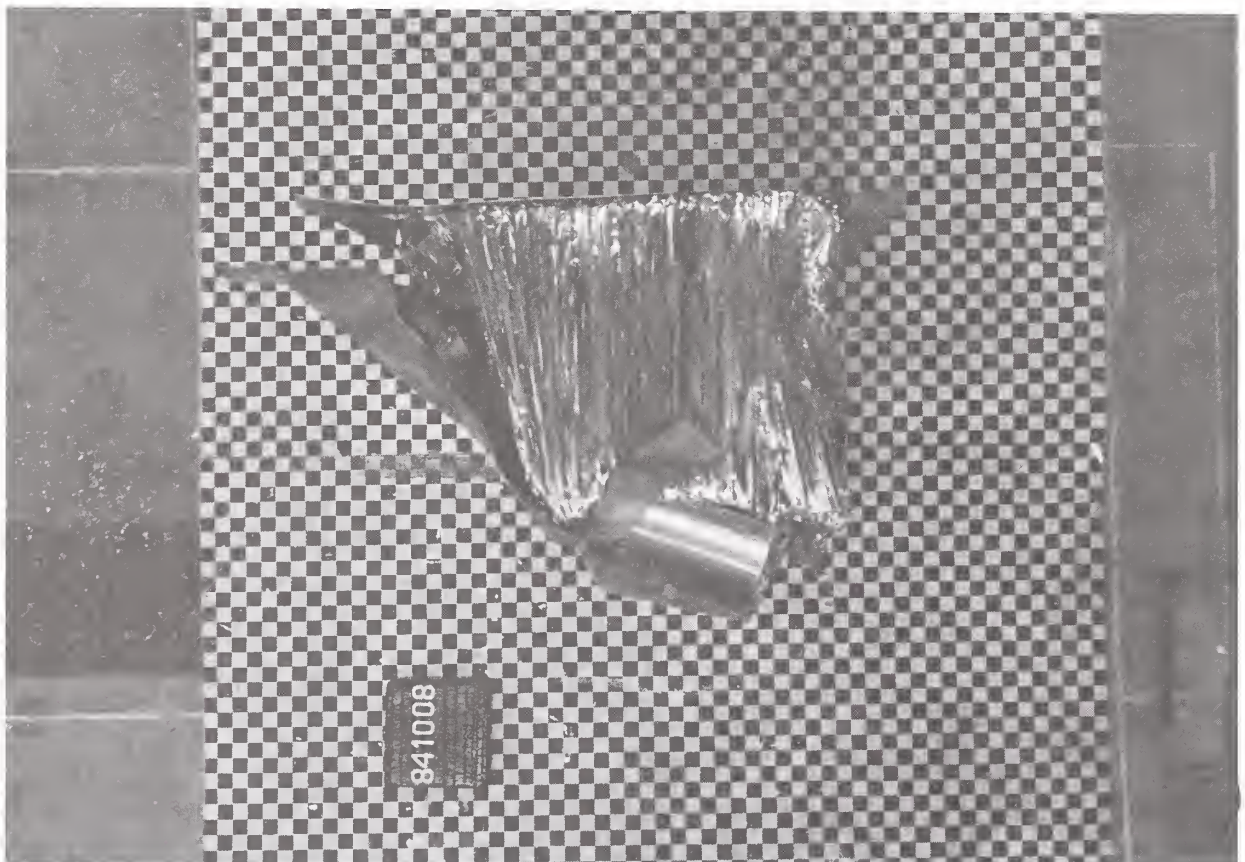


Figure A-30. POST-TEST MDB FACE - VIEW 2

APPENDIX B
DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. The data was filtered according to SAE J211, except dummy thorax data which was filtered using the HSRI filter.

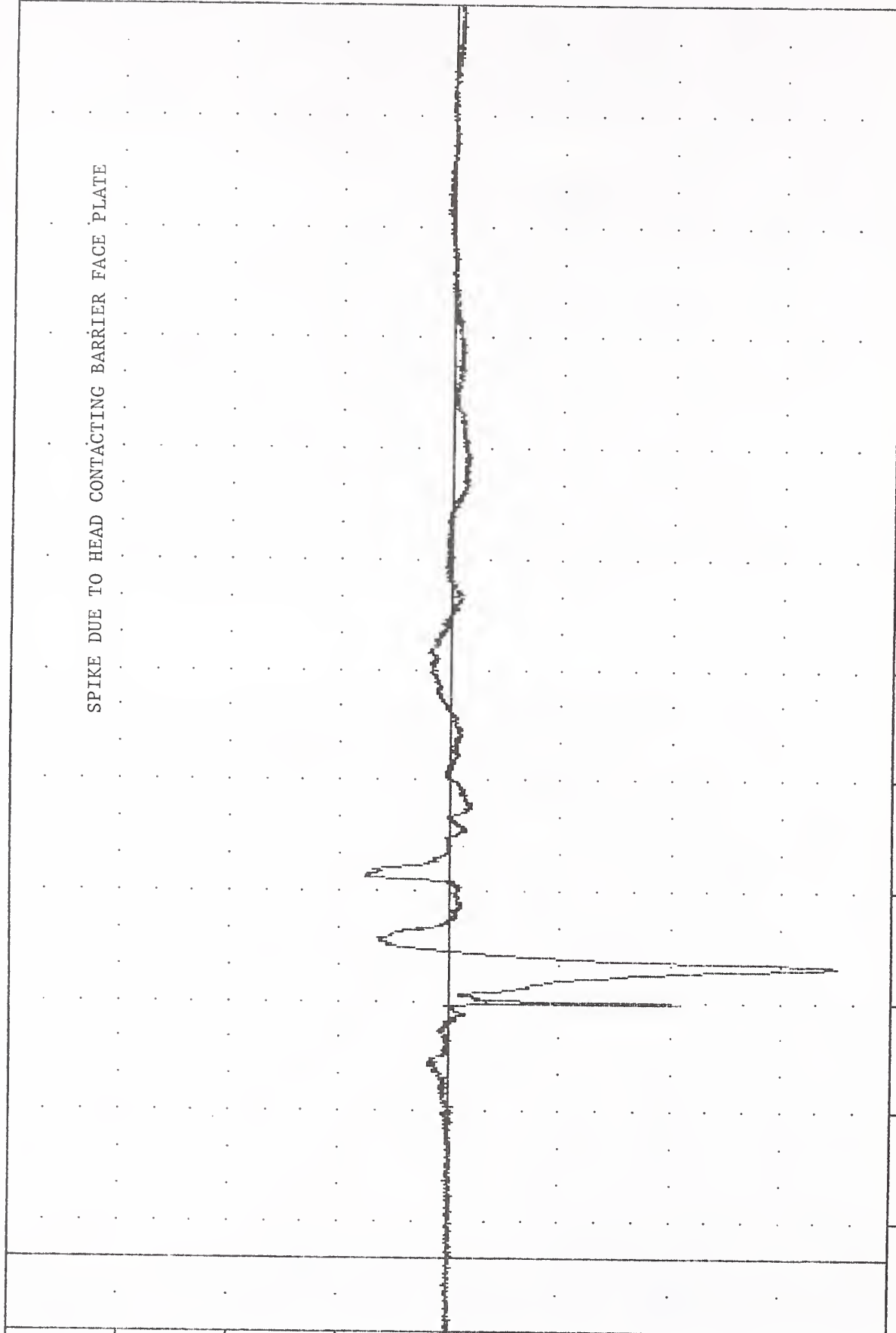
THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
HEDXG1

PLU1 DATE 1/1-UCT-84 10:12:38

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -175.270 79.38, 38.65 @ 103.88

ACCELERATION (G)

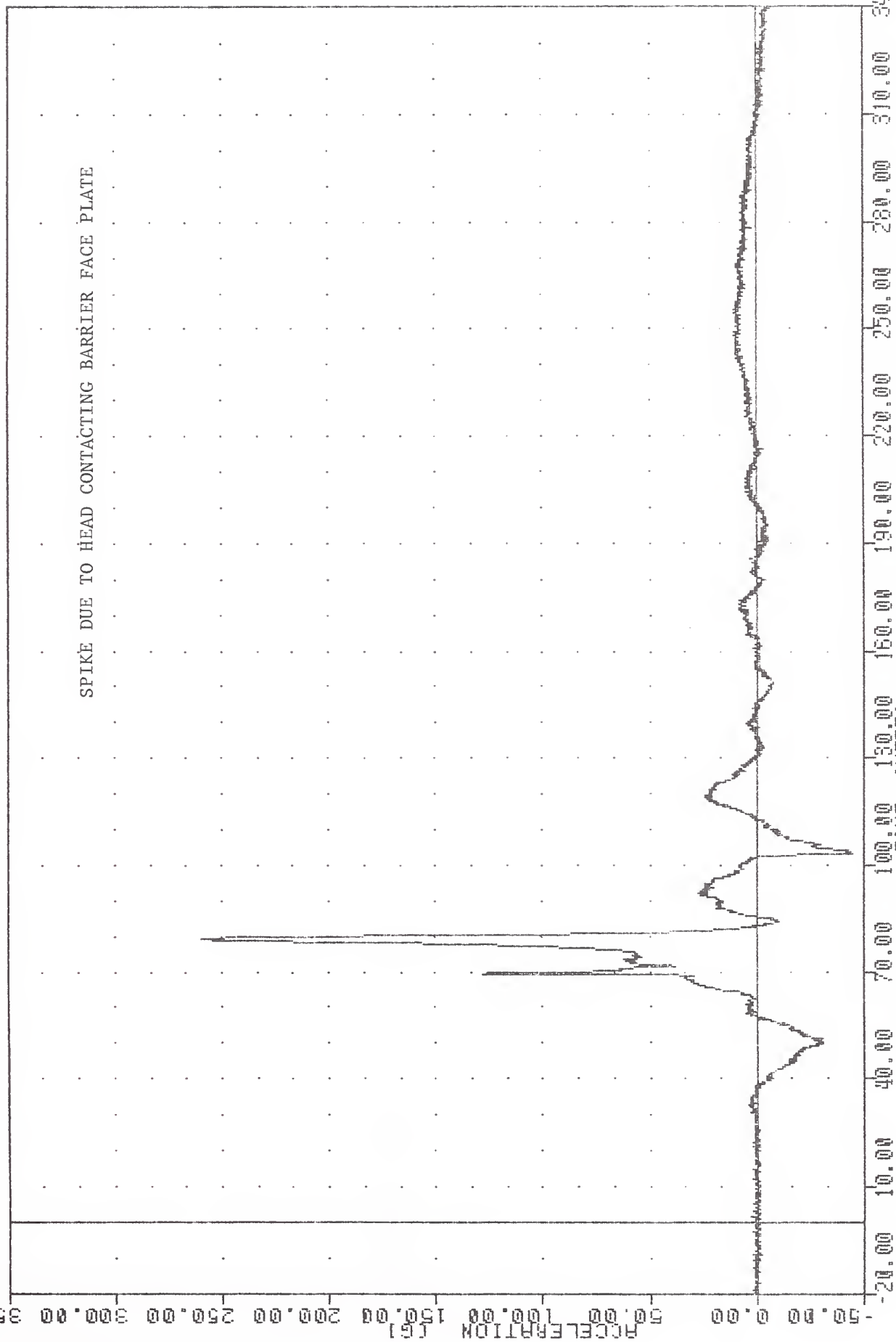


SPIKE DUE TO HEAD CONTACTING BARRIER FACE PLATE

-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION X AXIS

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 HEDYG1
 PLOT DATE 18-OCT-84 16:14:32
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -44.780 103.25, 259.82 0 79.13



SPIKE DUE TO HEAD CONTACTING BARRIER FACE PLATE

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER HEAD ACCELERATION Y AXIS

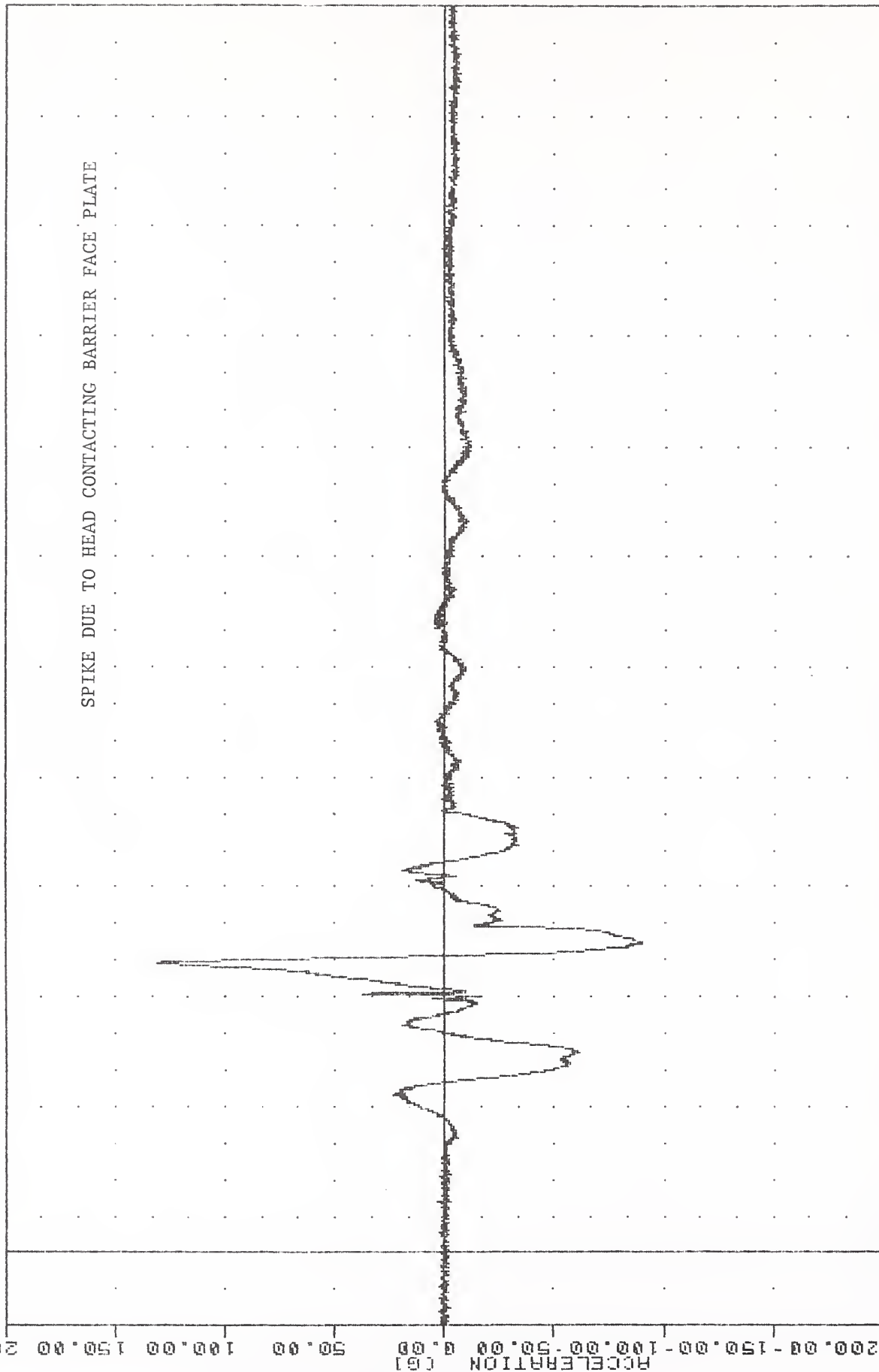
TAC 841006
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 HEDZ61

PLU1 DATE 17-OCT-84 10:12:38

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -90.040 84.88 130.48 79.13

200.00



B-4

TIME (MSEC)

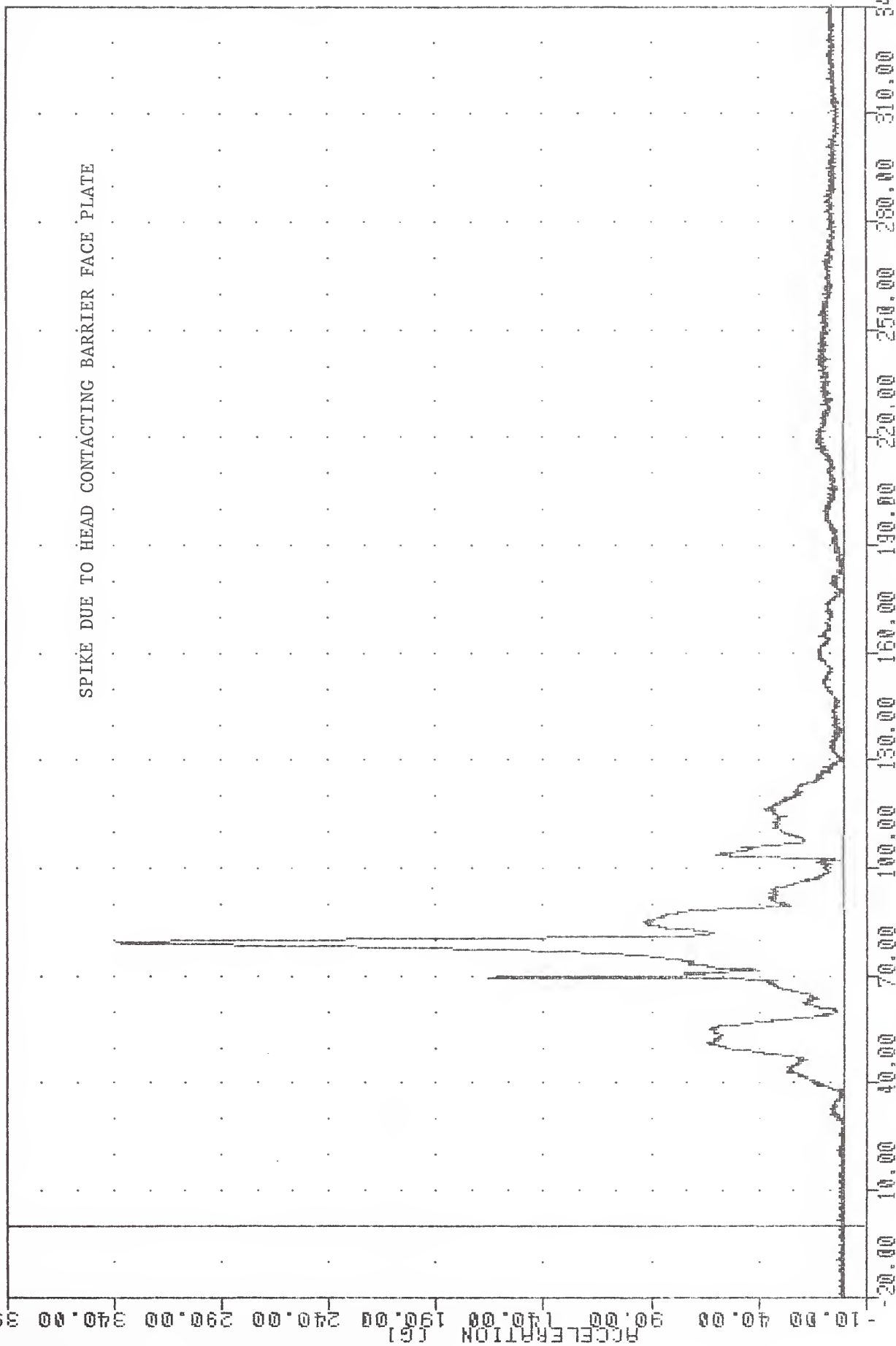
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER HEAD ACCELERATION Z AXIS

TRC . 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 HEDRG1

PLOT DATE 17-OCT-84 10:12:38

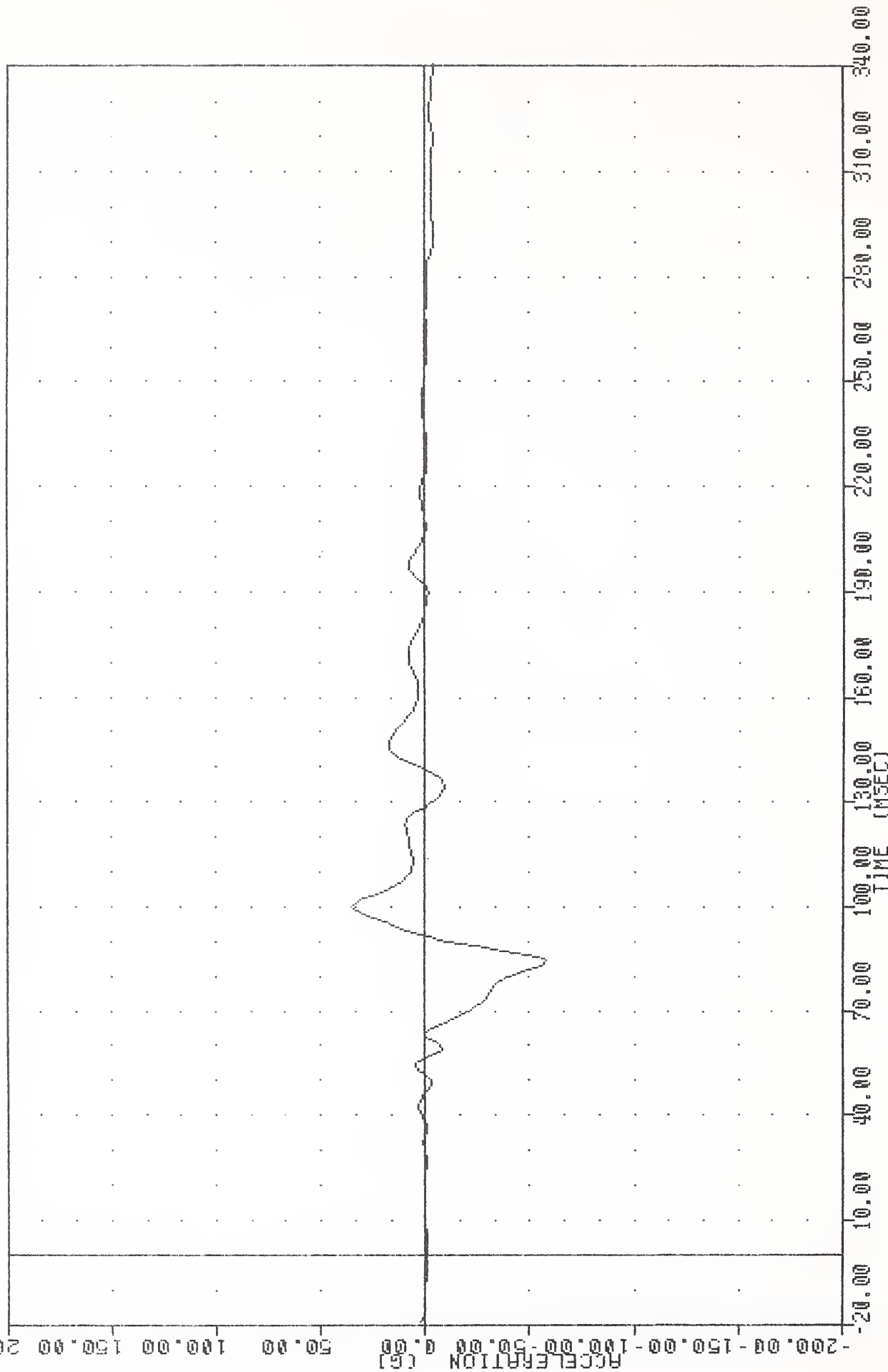
FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = 0.12e 21.00, 338.38 e 79.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER HEAD RESULTANT

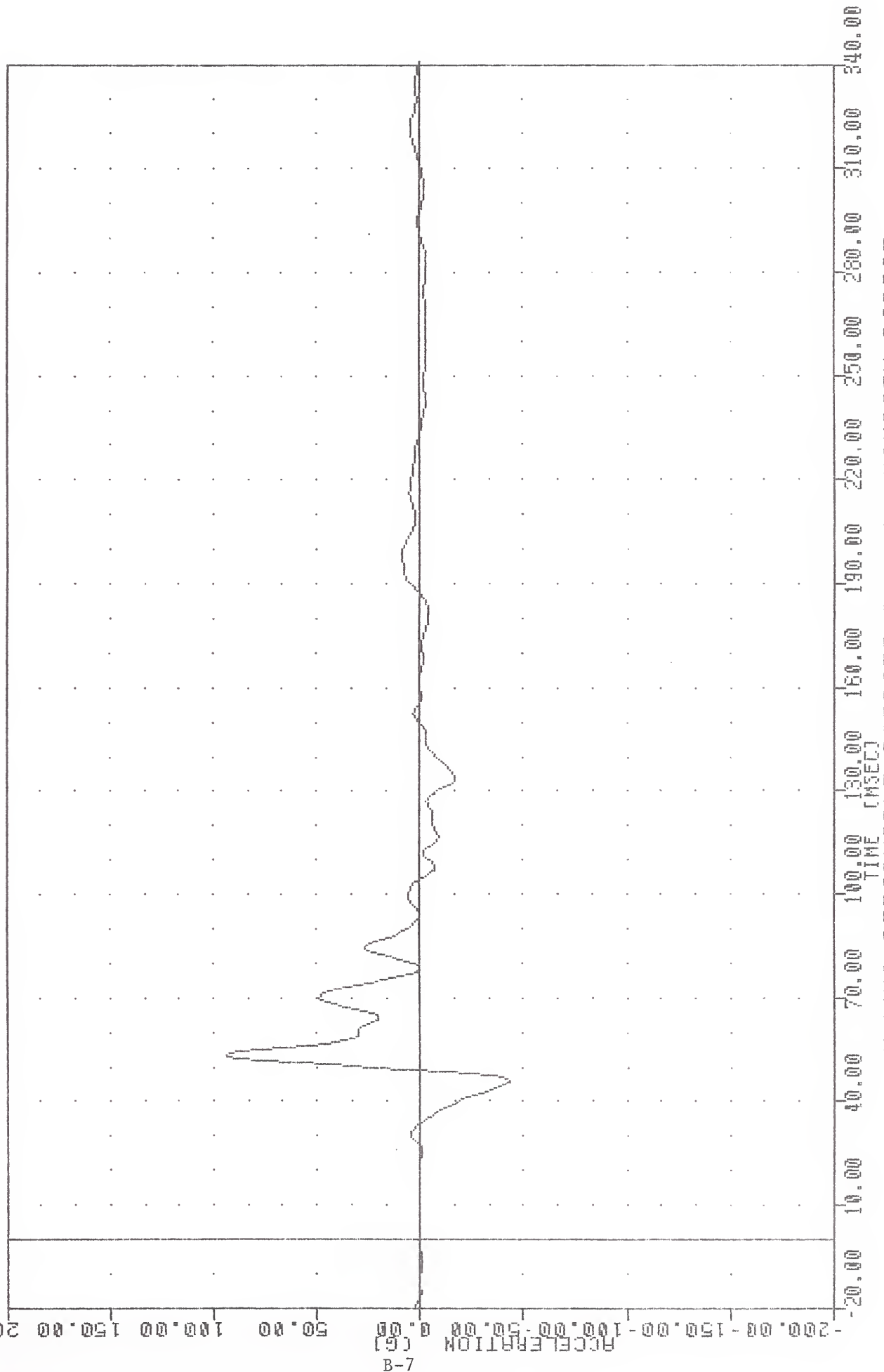
TRC 841008 PLU1 DATE 17-UCT-84 10:13:38
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000 FILTER = HSRI 136/ 189/ -50
 701XG1 MIN, MAX VALUES = -57.64e 83.75, 34.93 e 99.37



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE ACCELERATION X AXIS

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01Y61

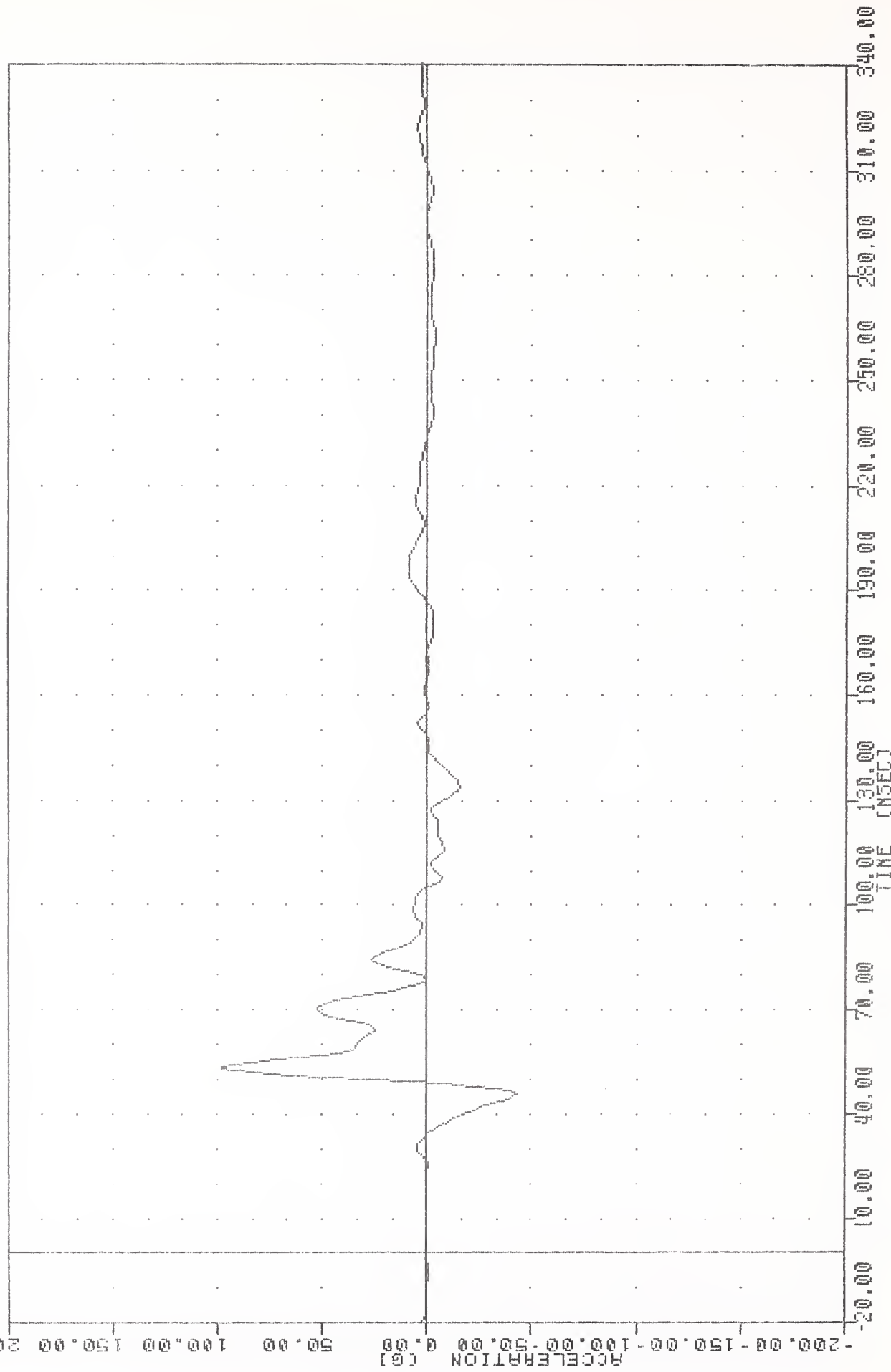
PLU1 DATE 17-UCT-84 10:13:38
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -43.030 45.00, 93.19 52.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE ACCELERATION Y AXIS

TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01Y6R

PLU1 DATE 17-UCT-84 10:13:38
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -42.90e 45.00 , 98.34 e 52.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE ACCELERATION -2 Y AXIS

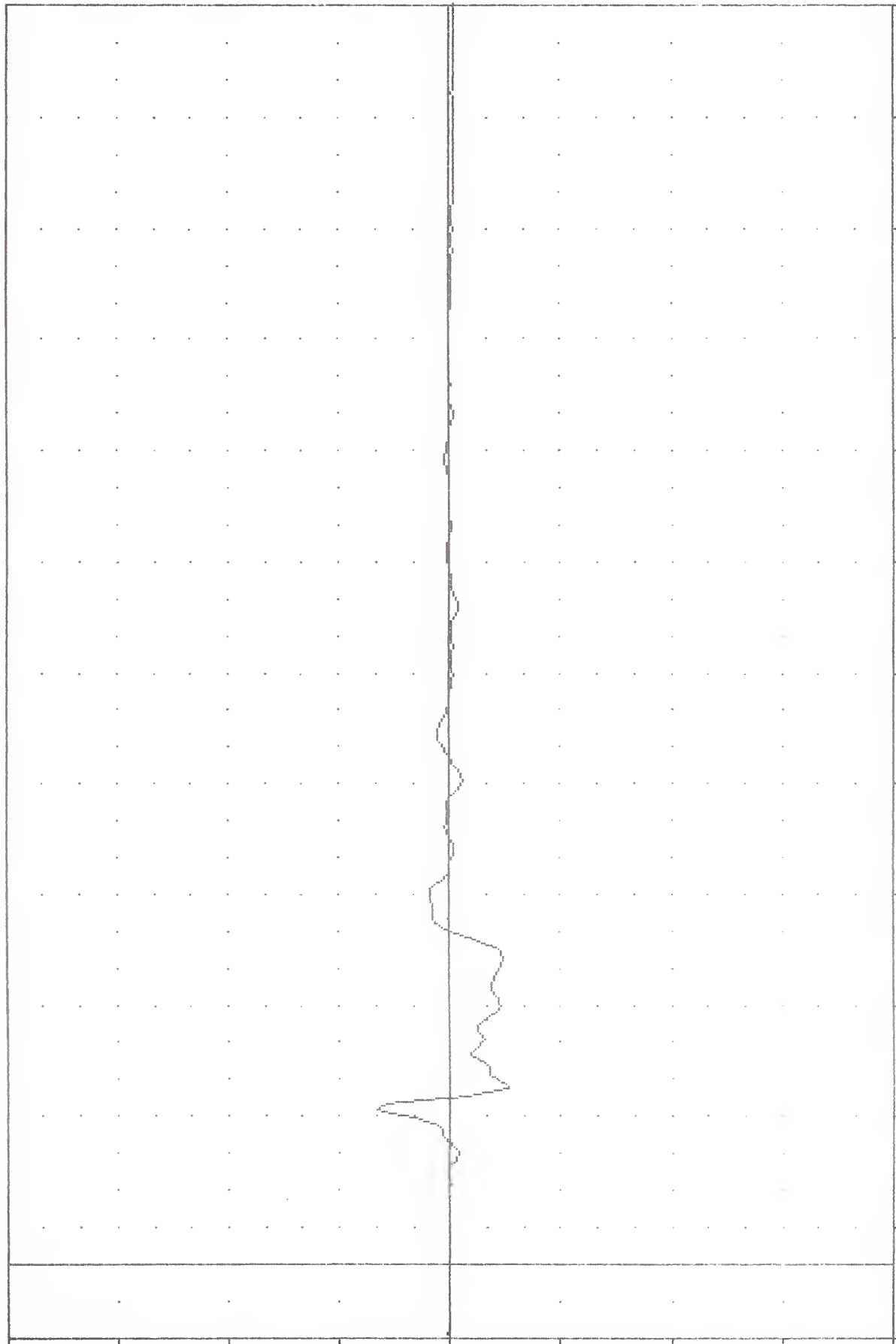
TRC ,841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T01ZG1

PLU1 DATE 17-OCT-84 10:13:30

FILTER = HSR1 136/ 189/ -50

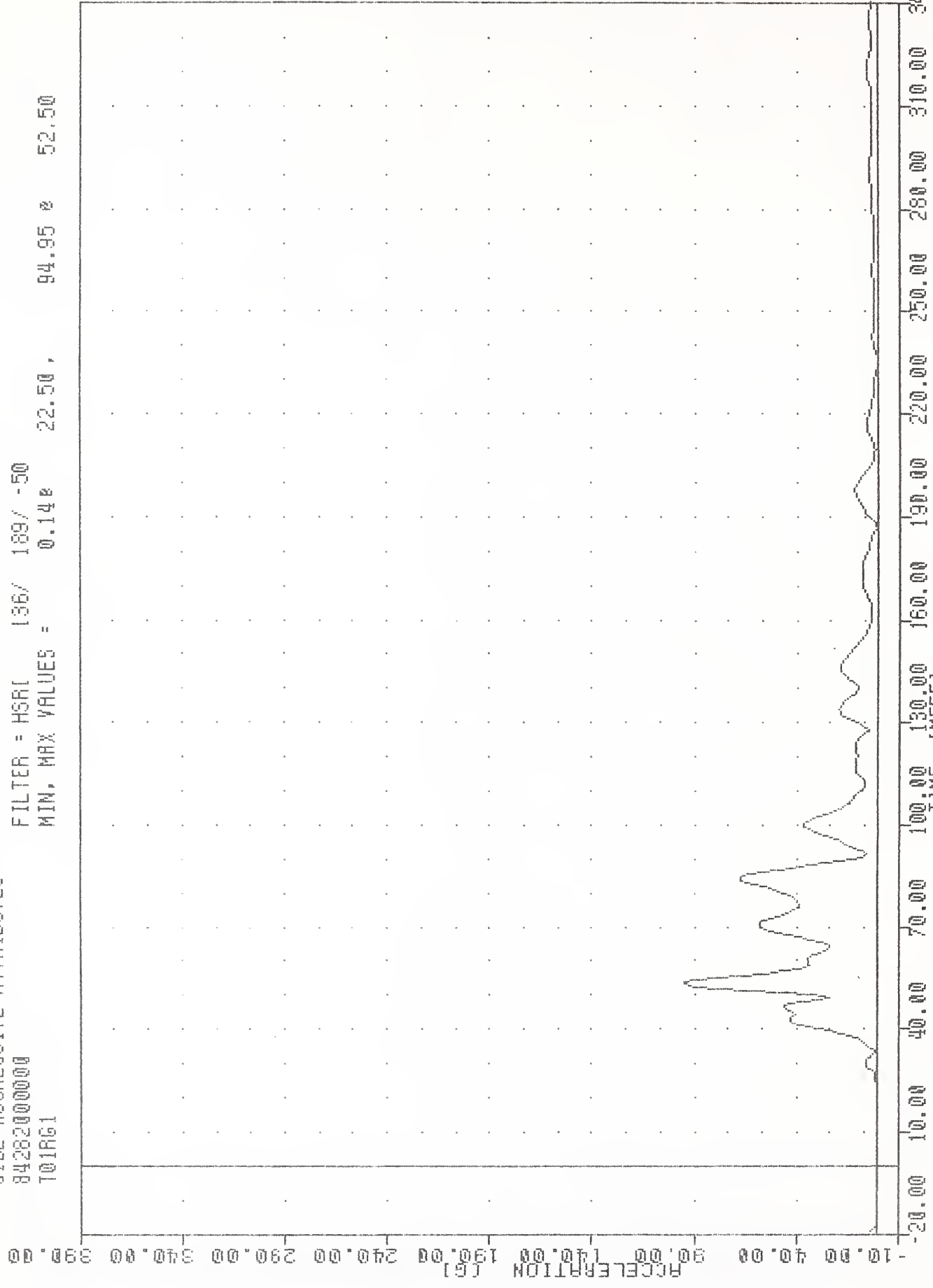
MIN, MAX VALUES = -26.48 47.50 , 32.72 41.25

ACCELERATION [G]



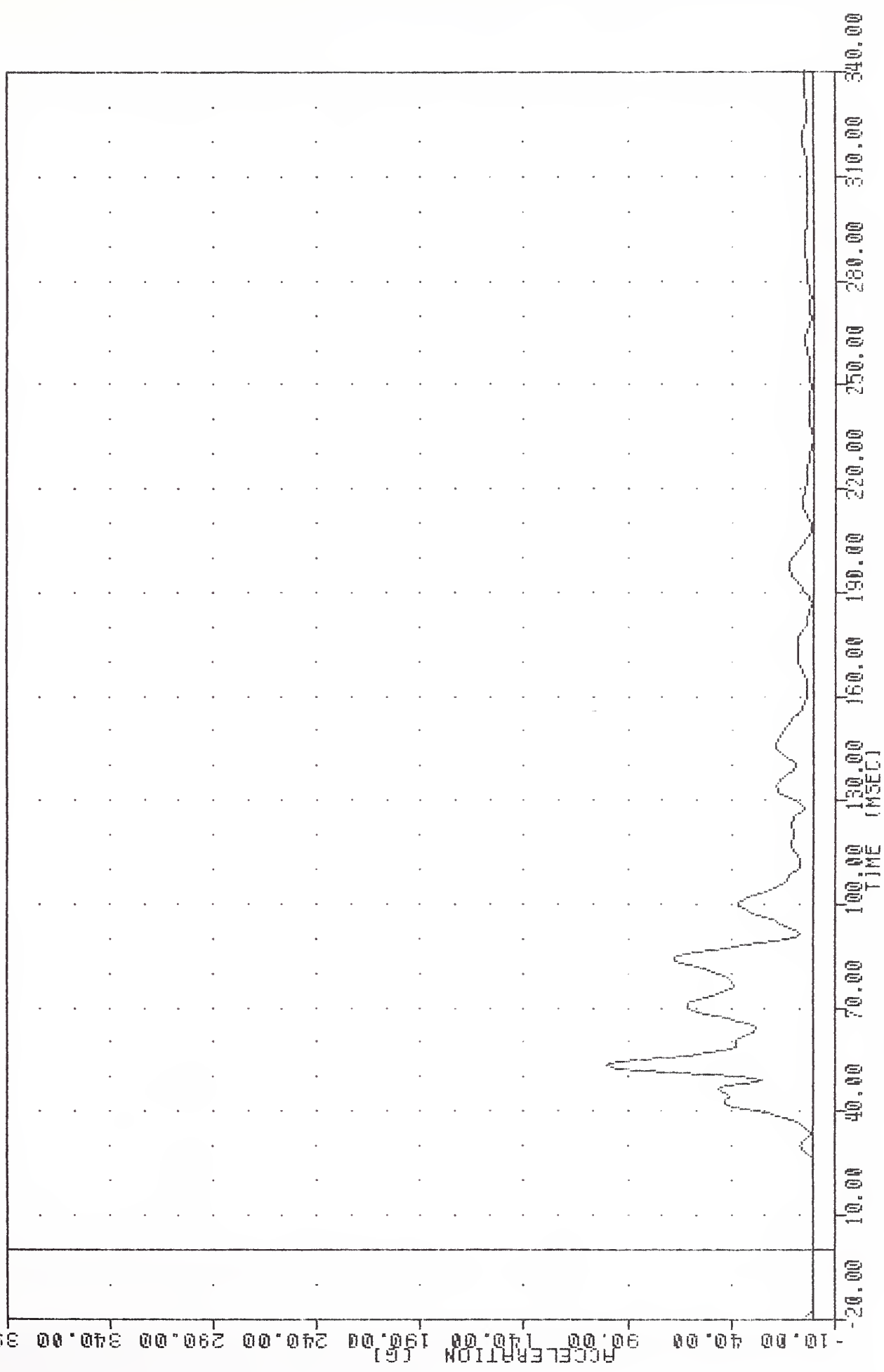
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Z AXIS

THU 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01RG1
 PLU1 DATE 1/-UCT-84 10:13:38
 FILTER = HGR1 136/ 189/ -50
 MIN, MAX VALUES = 0.148 22.50 , 94.95 52.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE RESULTANT

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 T01RGA
 PLU1 DATE 17-UCT-84 10:14:56
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.15e 22.50, 100.02 e 52.50



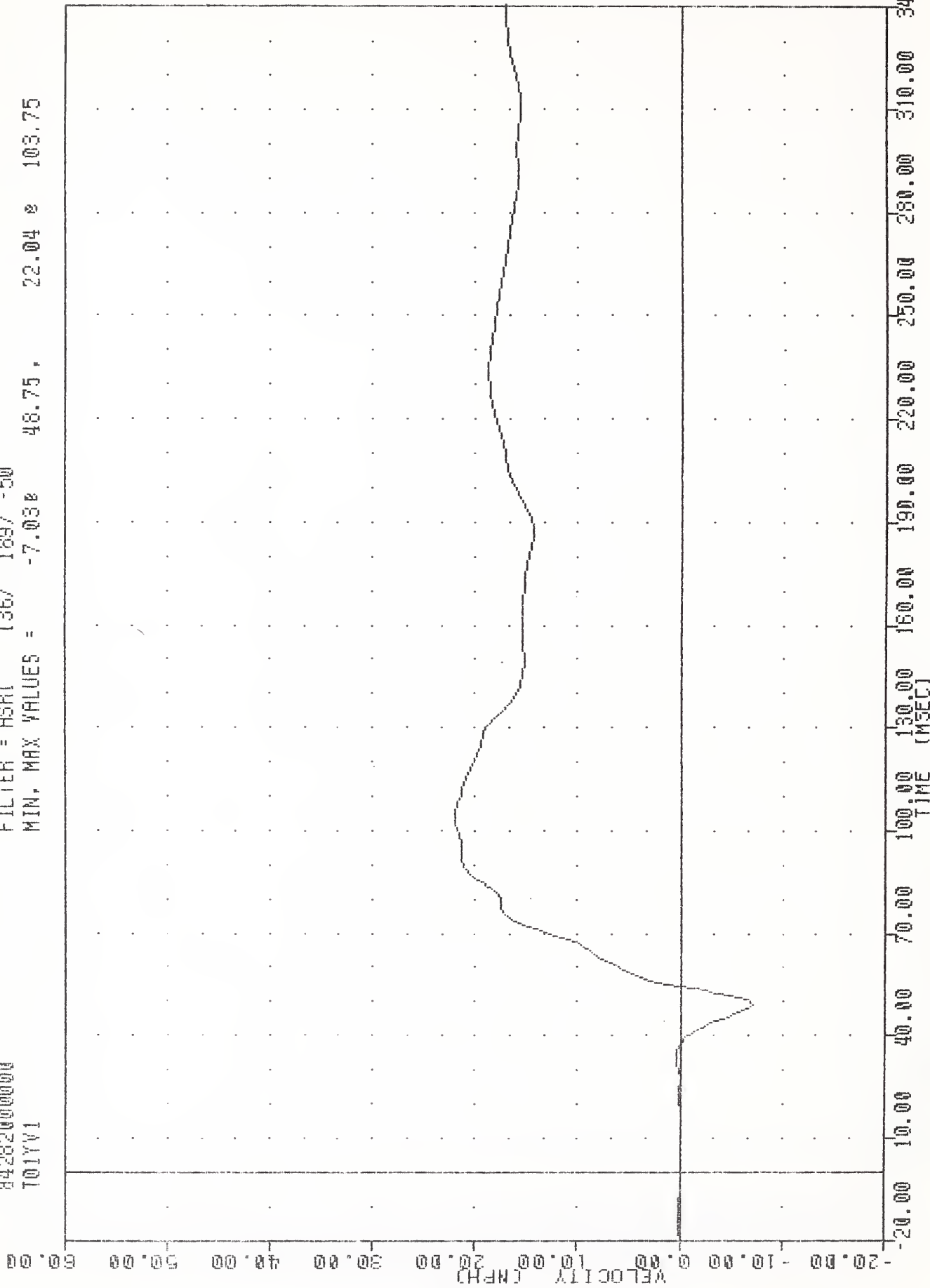
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE RESULTANT USING T01YGA

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 T01YV1

PLU1 DATE 17-UCT-84 10:15:20

FILTER = HSR1 136/ 189/ -50

MIN. MAX VALUES = -7.03e 48.75 , 22.04 e 103.75



B-12

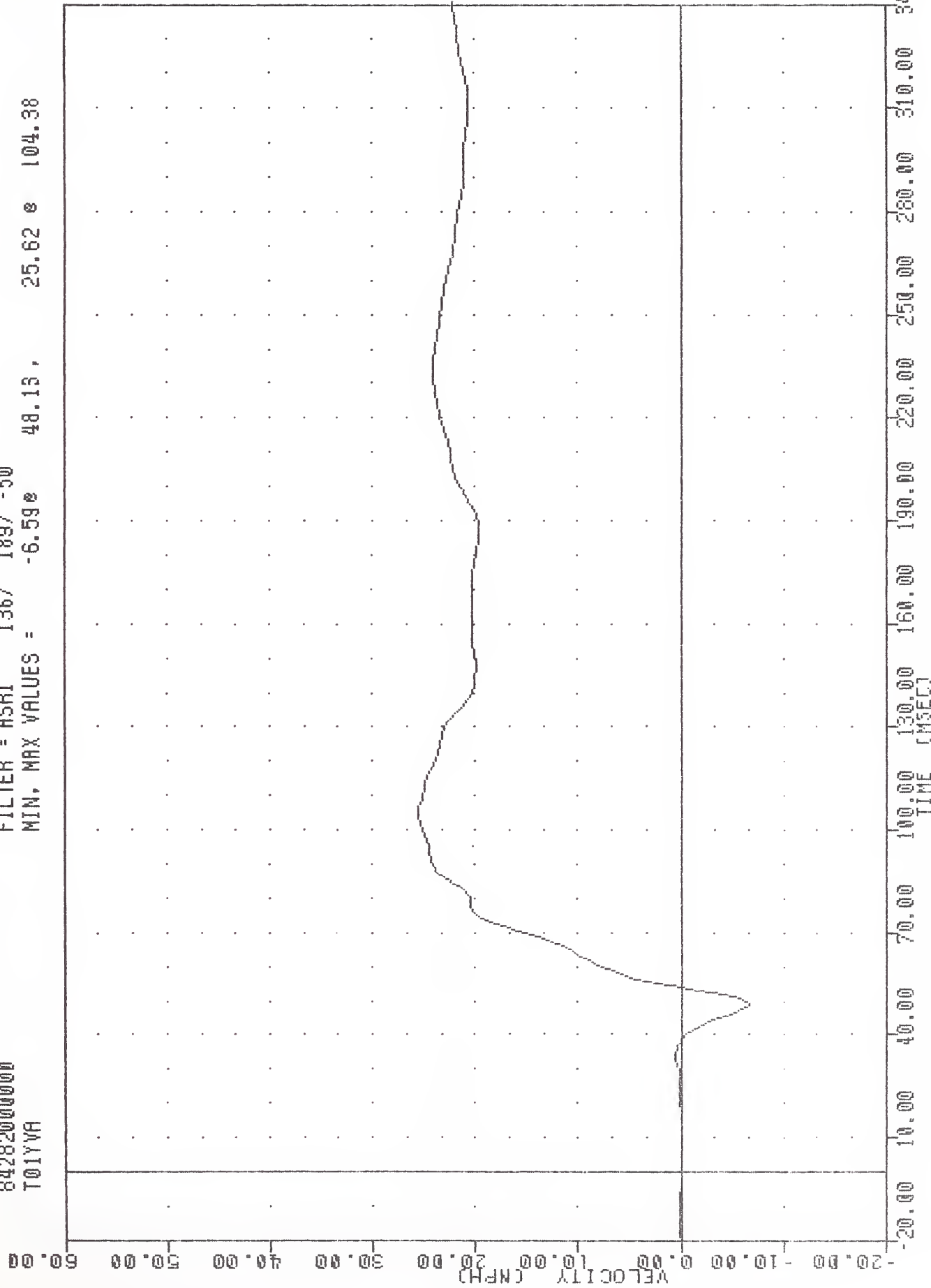
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T01YG1

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T01YVA

PLOT DATE 17-OCT-84 10:15:20

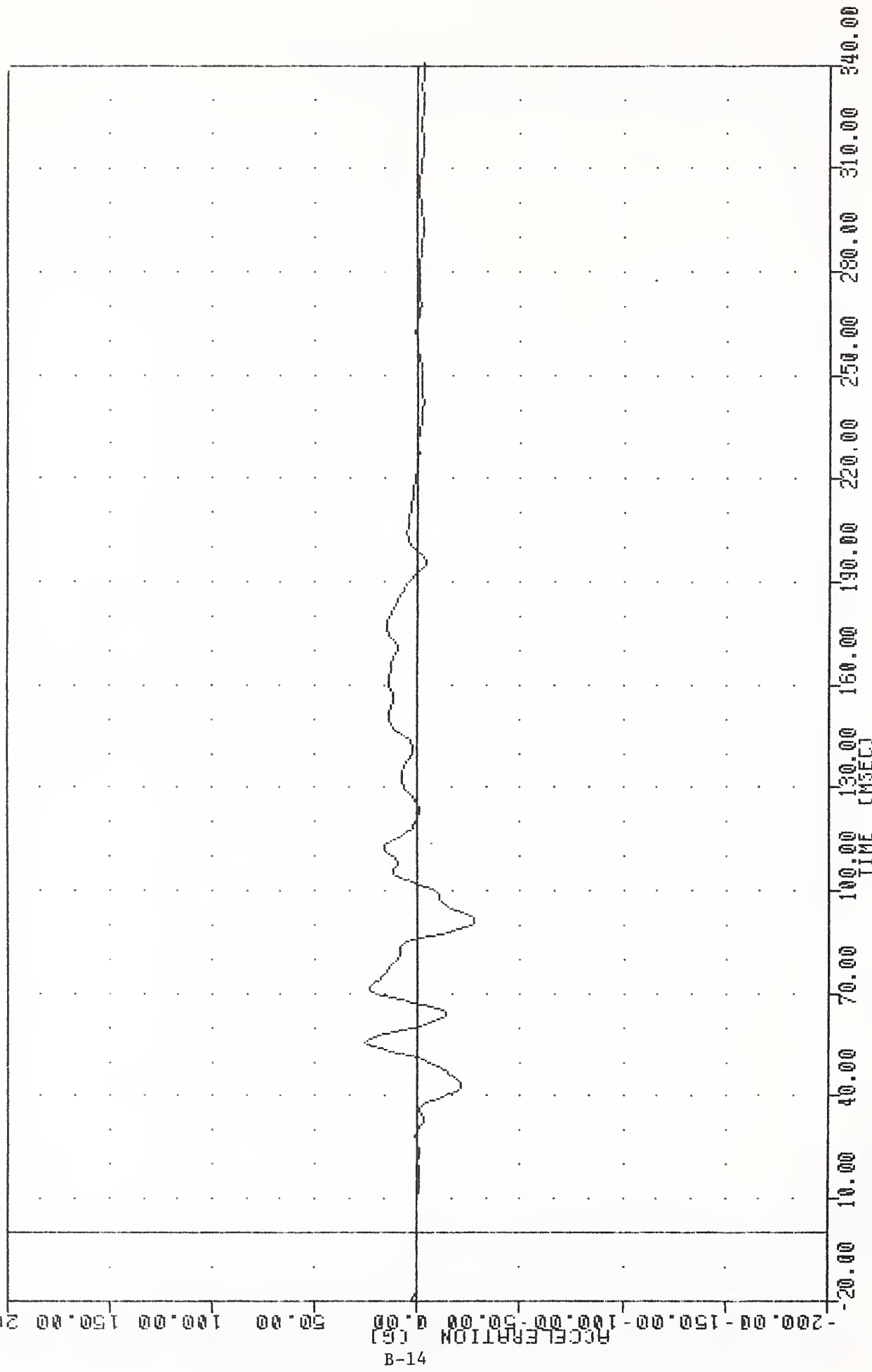
FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -6.590 48.13, 25.62 @ 104.38



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGA

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T12XG1
 PLOT DATE 17-OCT-84 10:13:38
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -27.46 90.62, 25.54 55.00

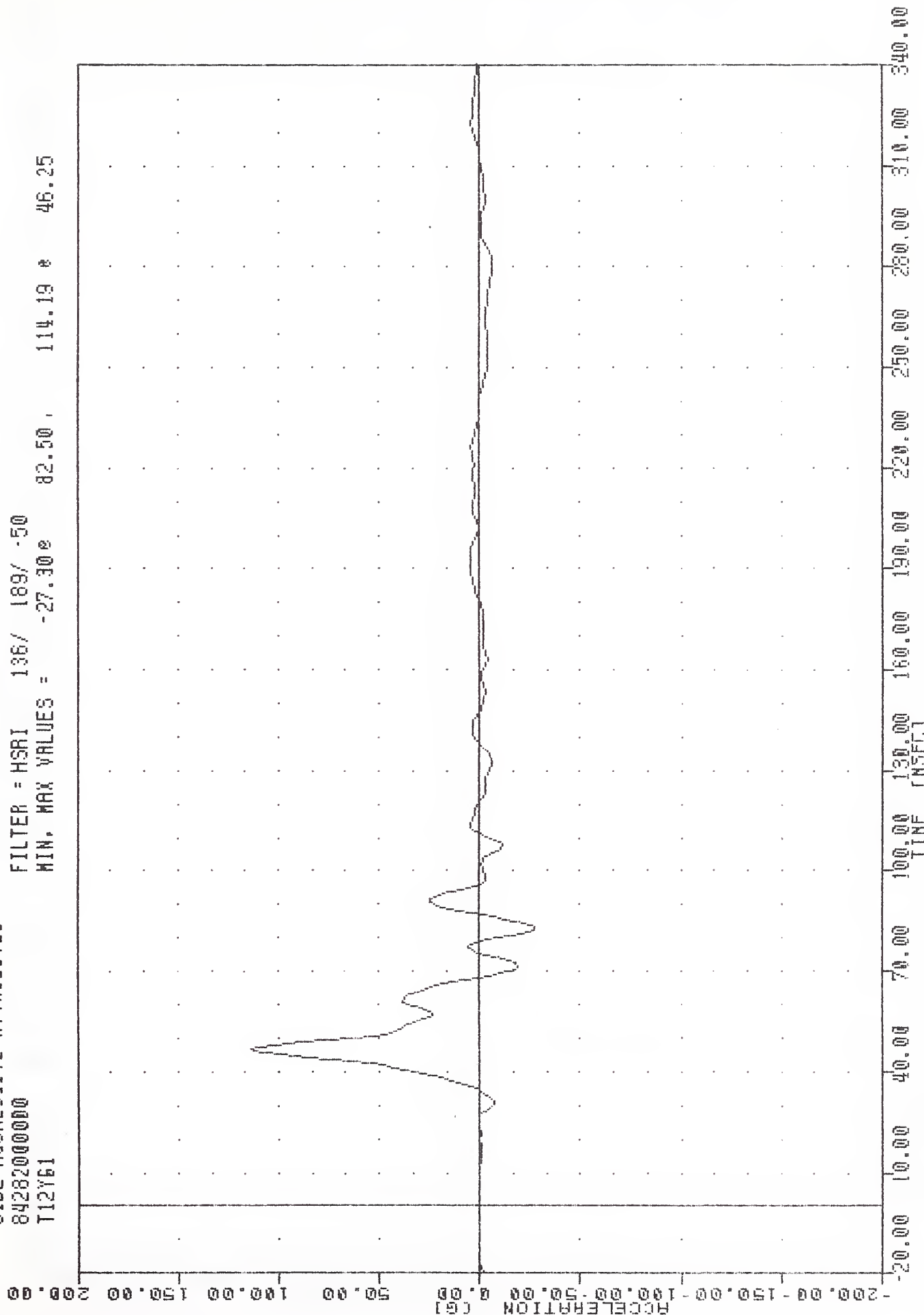


TAC . 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T12Y61

PLU1 DATE 17-UCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -27.30* 82.50 , 114.19 * 46.25



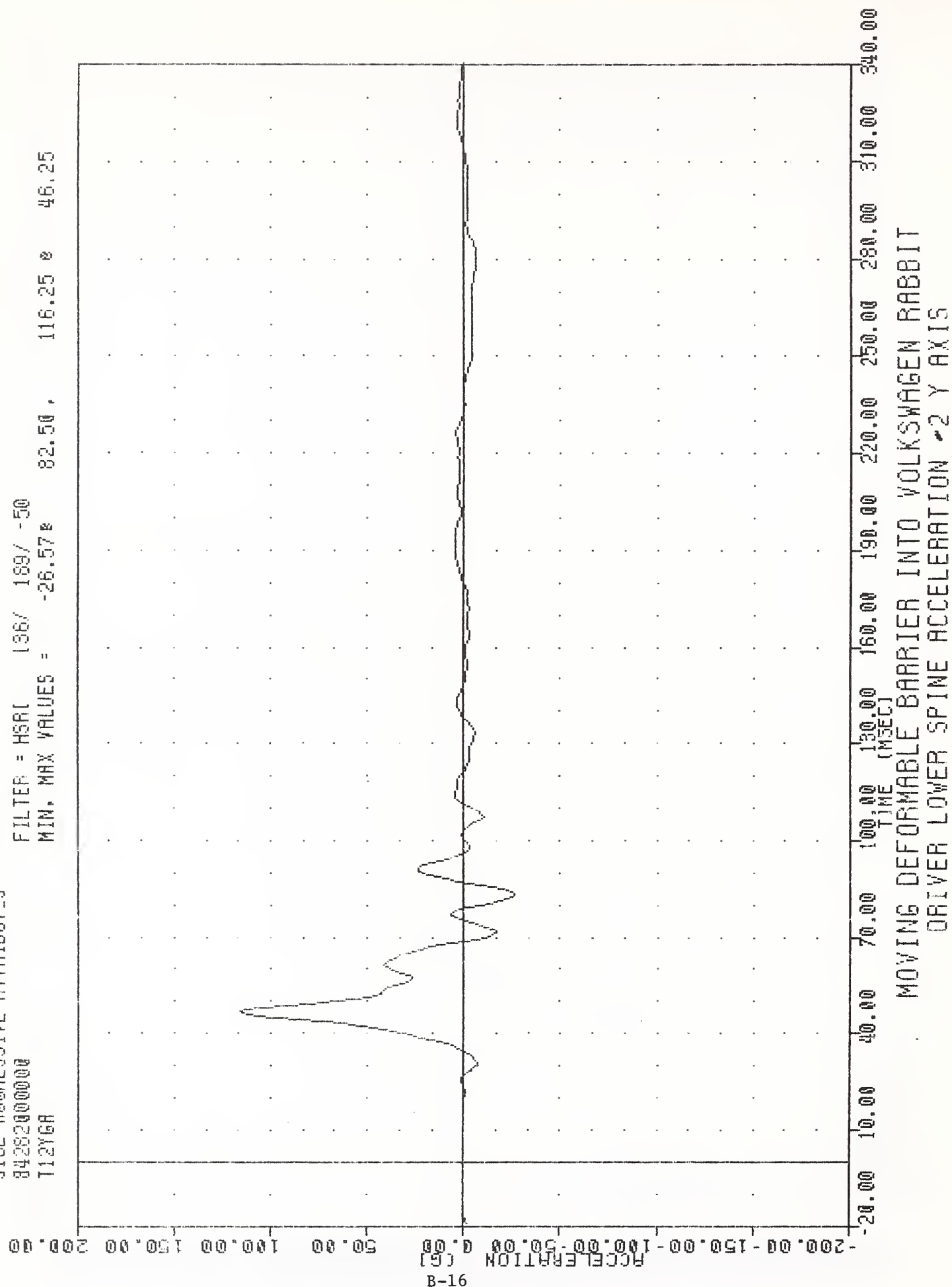
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE ACCELERATION Y AXIS

TRC 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 T12YGR

PLU1 DATE 17-OCT-84 10:13:38

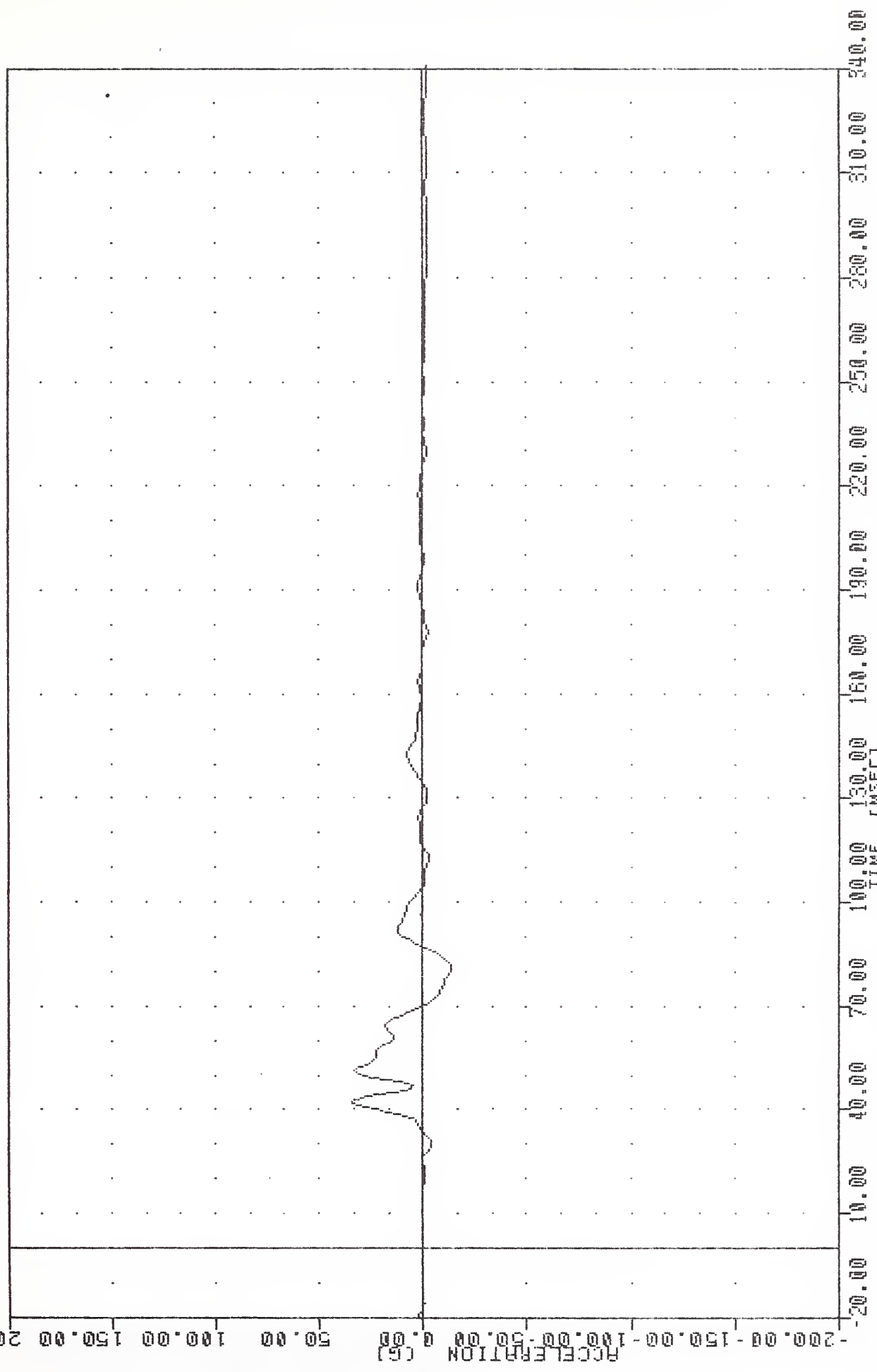
FILTER = HSRC 136/ 189/ -50

MIN. MAX VALUES = -26.57% 82.50, 116.25 % 46.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE ACCELERATION -2 Y AXIS

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T12Z61
 PLOT DATE 17-OCT-84 10:13:38
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -13.74e 80.63 , 34.37 e 41.87

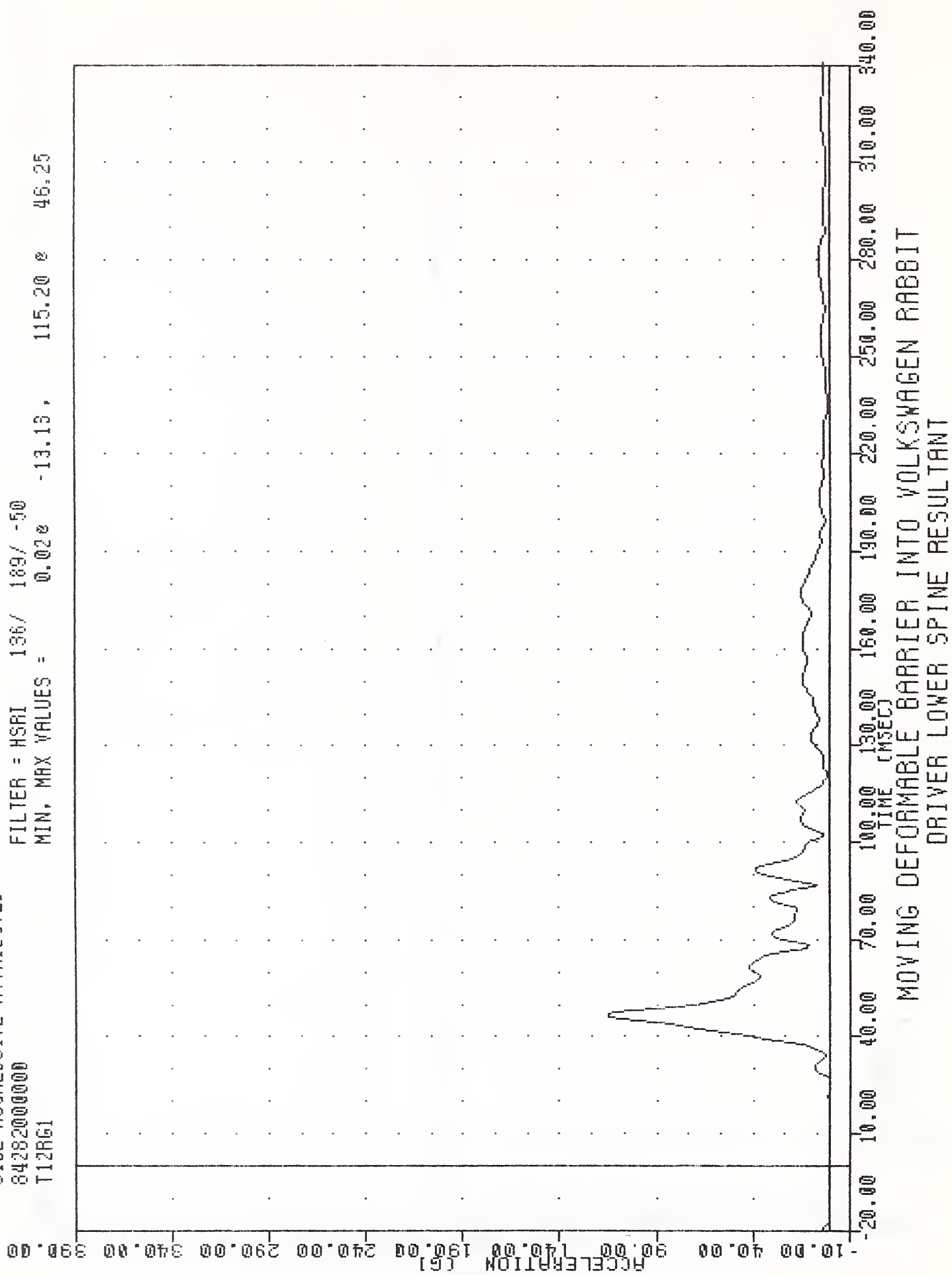


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE ACCELERATION Z AXIS

PLU1 DATE 17-UCT-84 10:13:38

THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
T12RG1

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = 0.020 -13.13 , 115.20 2 46.25



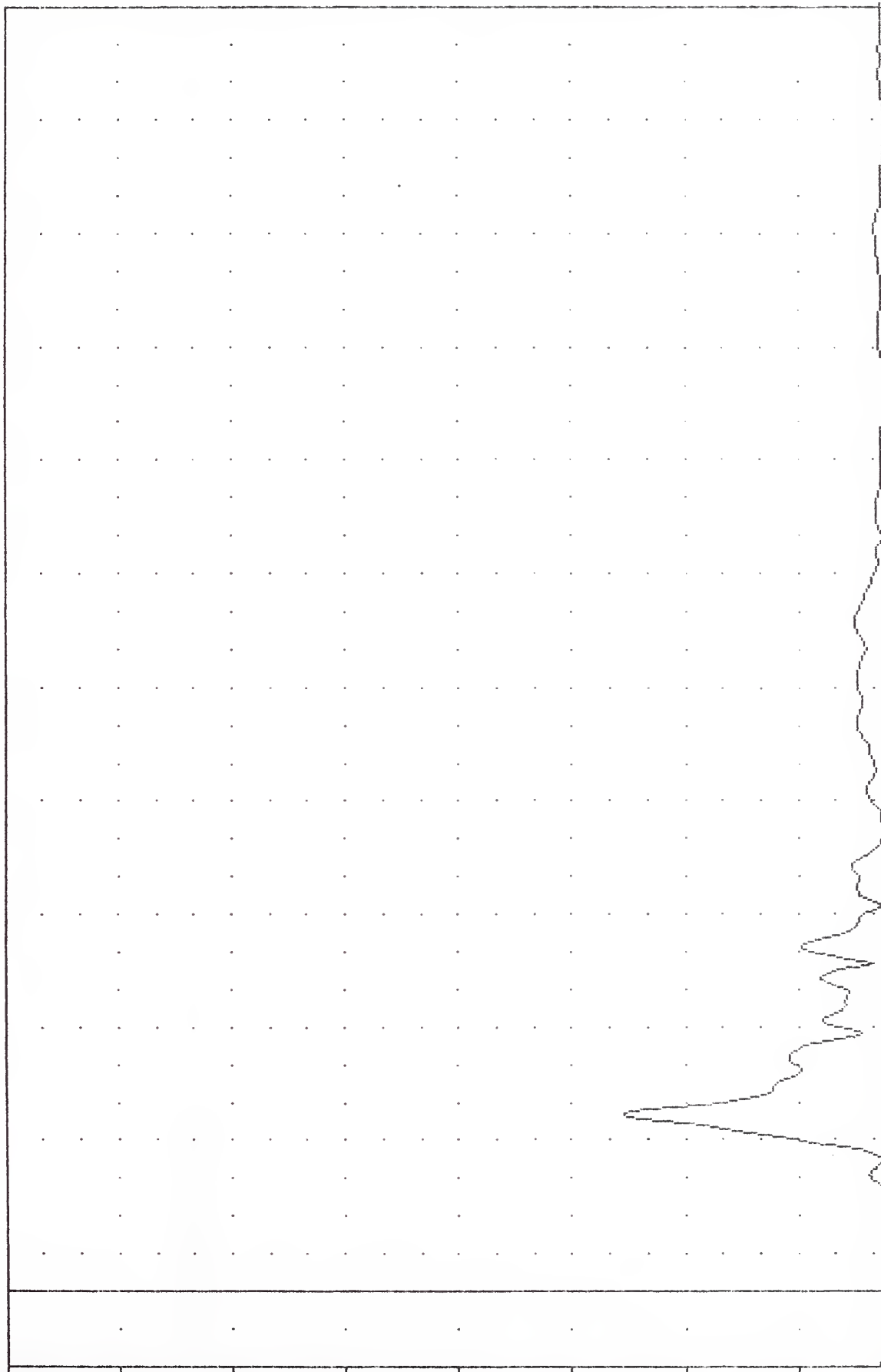
TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T12Y6A

PLOT DATE 17-OCT-84 10:14:56

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = 0.02e -13.13, 117.24 e 46.25

ACCELERATION (G)



-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE RESULTANT USING T12Y6A

TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 T12YV1

PLUT DATE 17-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.690 33.75 , 30.74 e 67.50

60.00

50.00

40.00

30.00

20.00

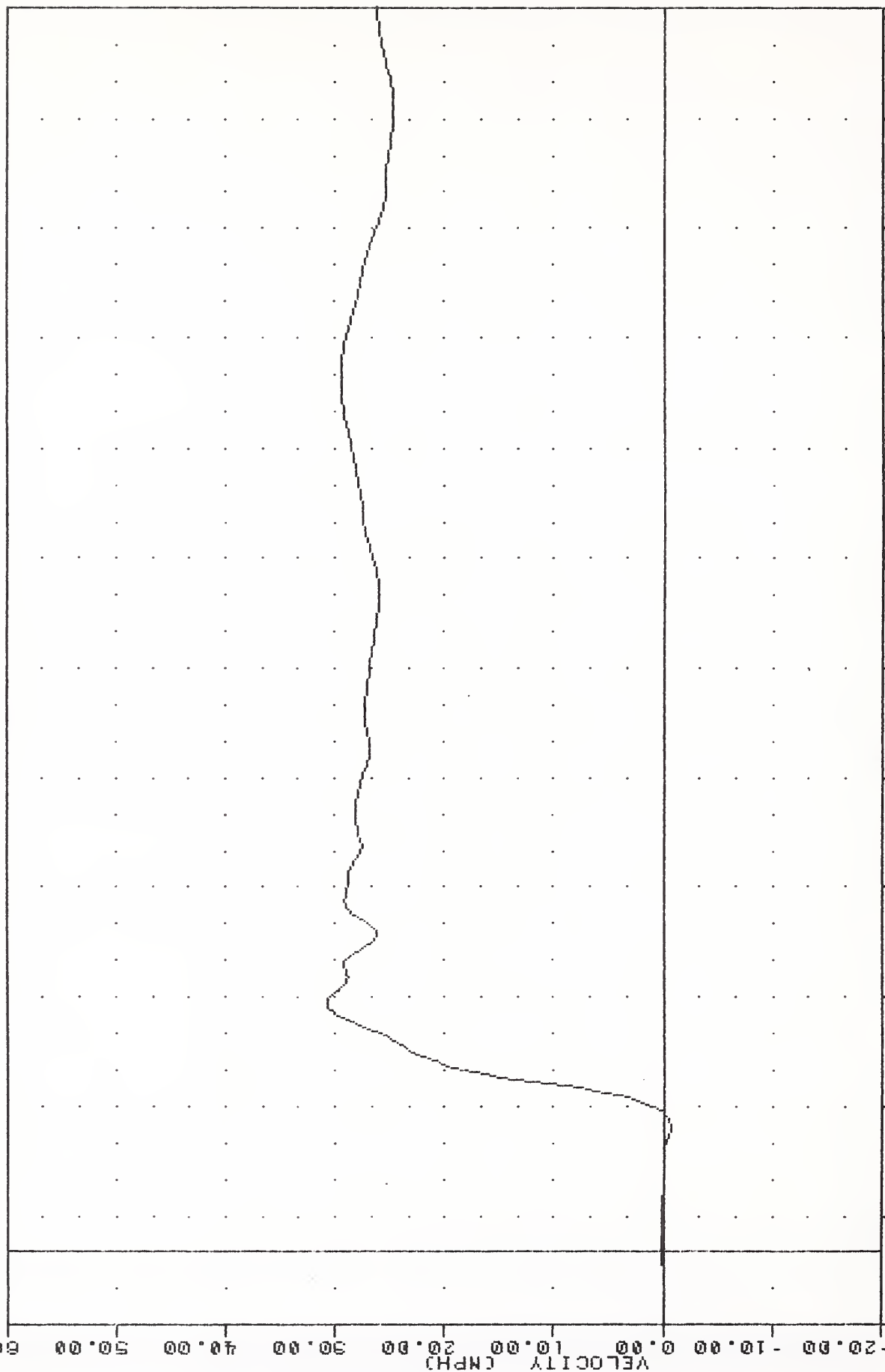
10.00

0.00

-10.00

-20.00

B-20



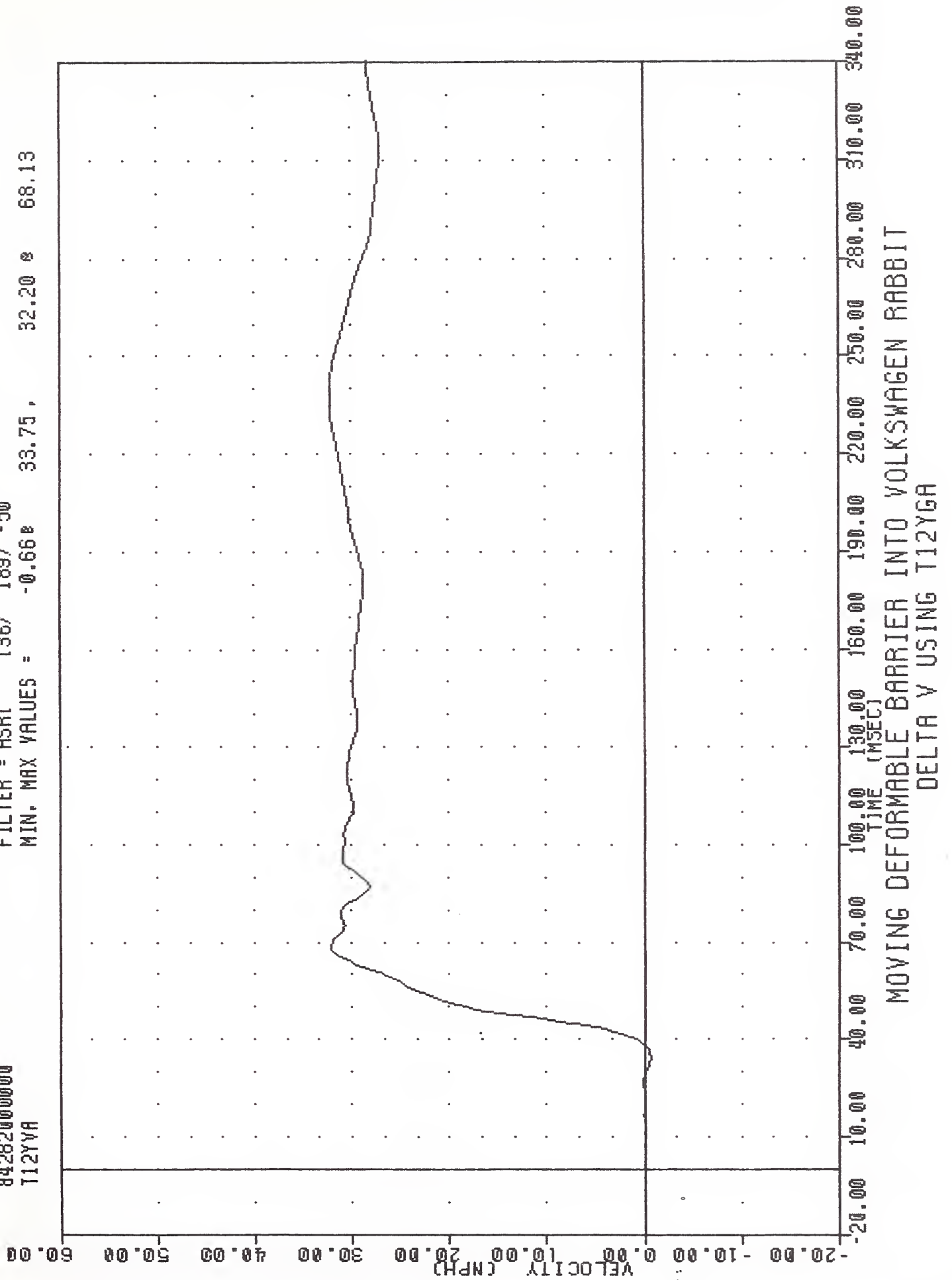
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T12YGI

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T12YVA

PLOT DATE 17-OCT-84 10:15:20

FILTER = HSR1 136/ 189/ -50

MIN. MAX VALUES = -0.668 33.75, 32.20 68.13

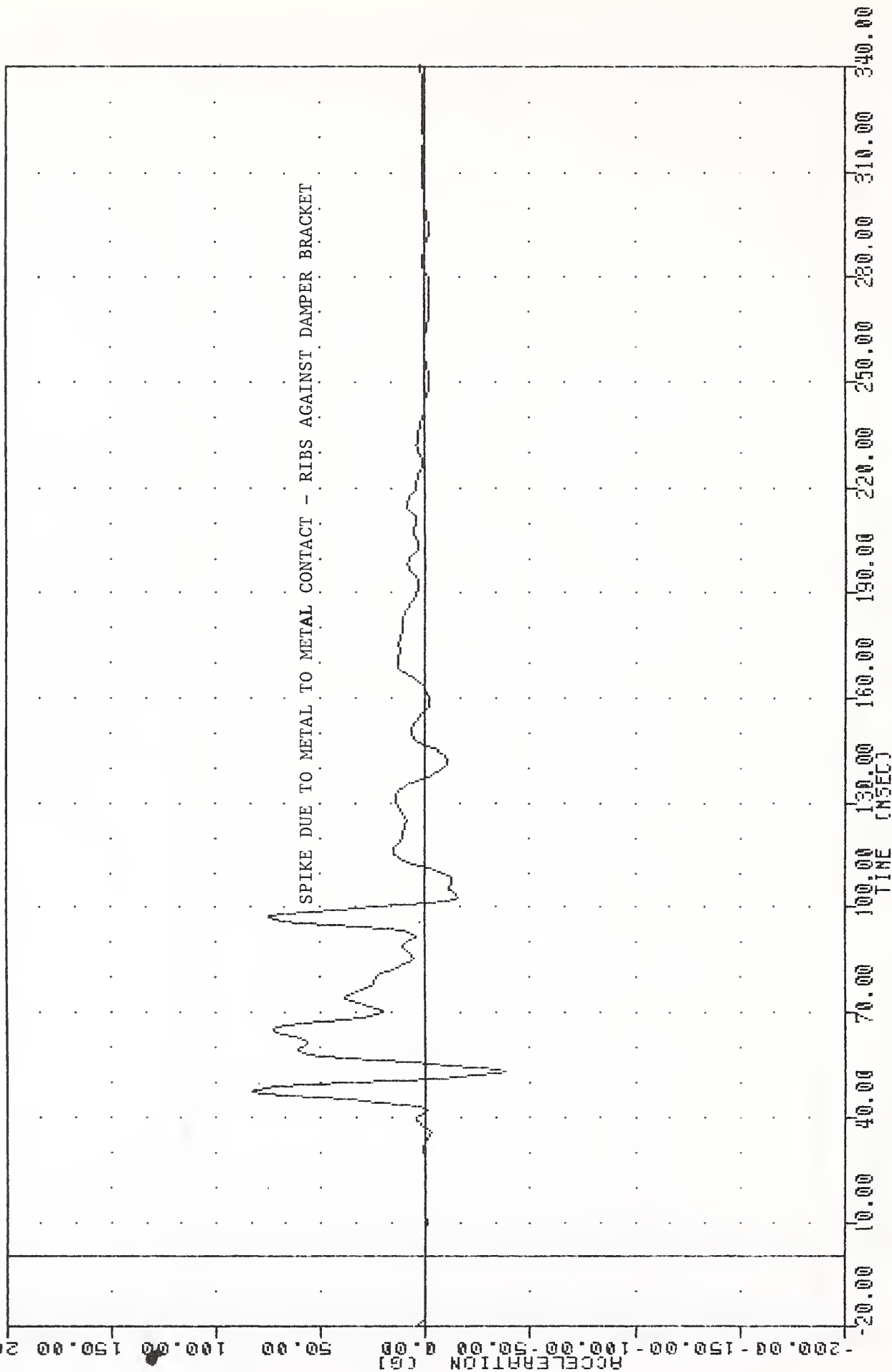


THC 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
LURY61

PLUI DATE 17-UCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -37.93e 52.50, 83.14 e 46.88



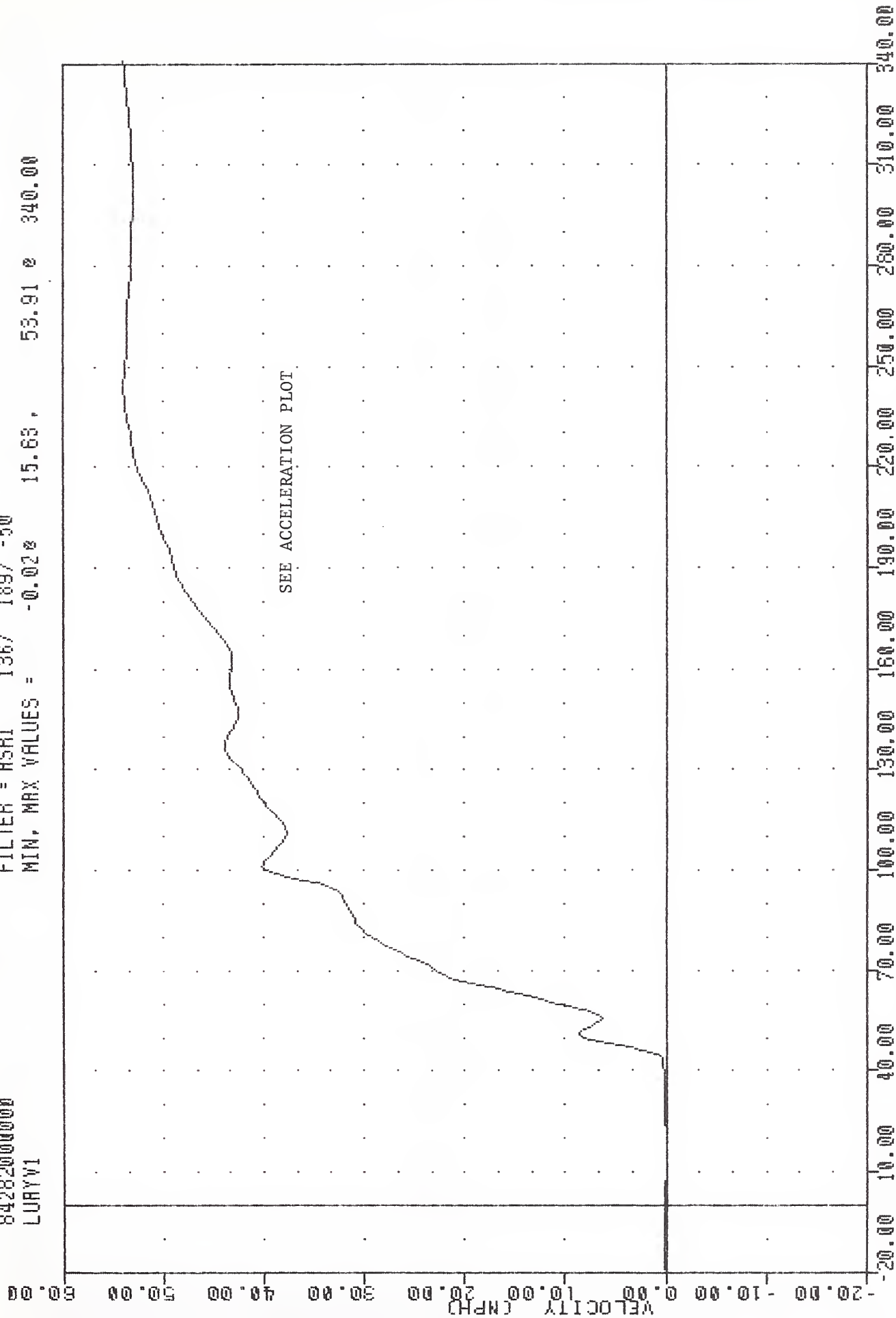
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION Y AXIS

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LURYV1

PLOT DATE 17-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.028 15.63, 53.91 @ 340.00

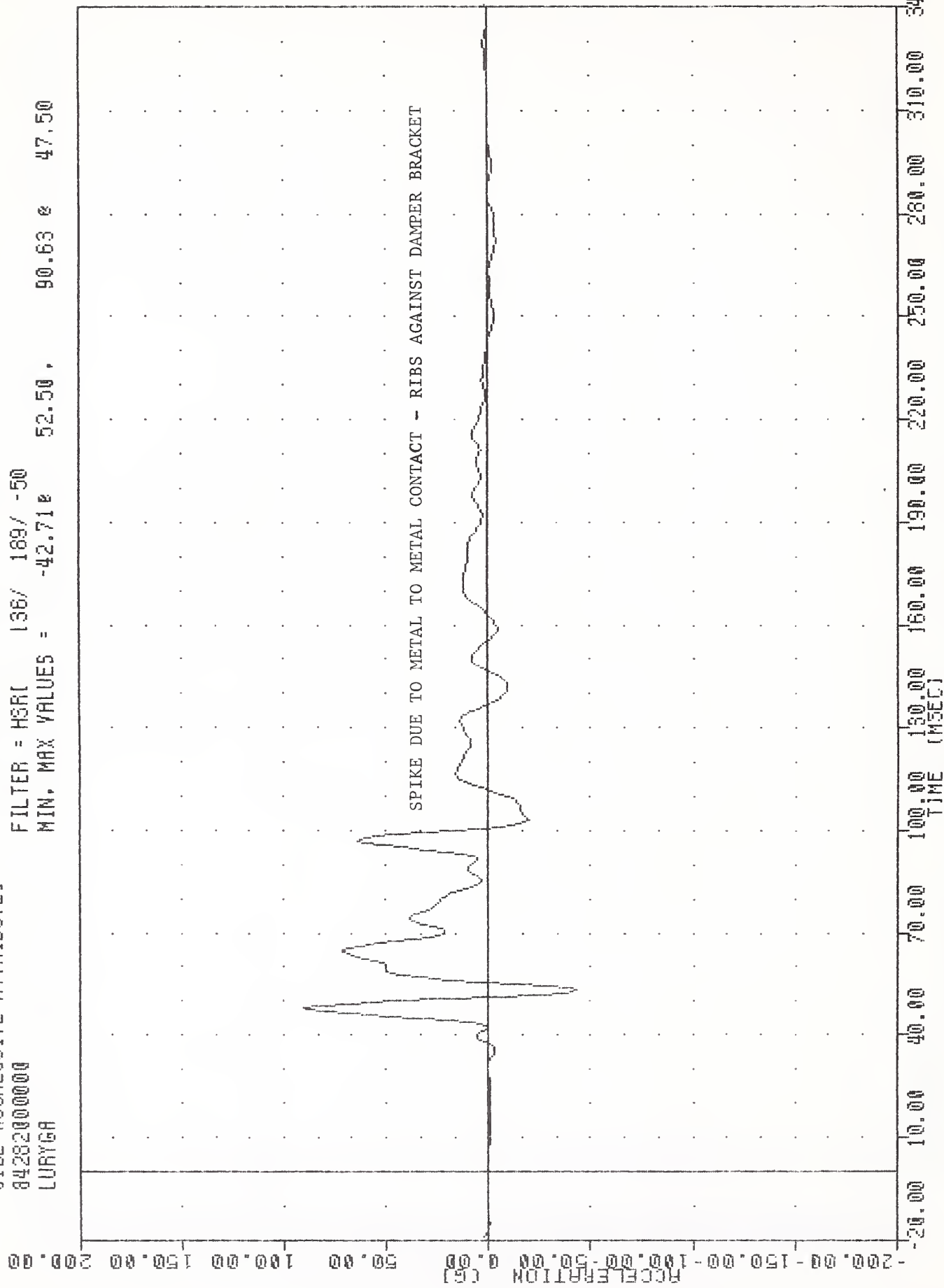


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LURY61

TRC .841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LURYGA

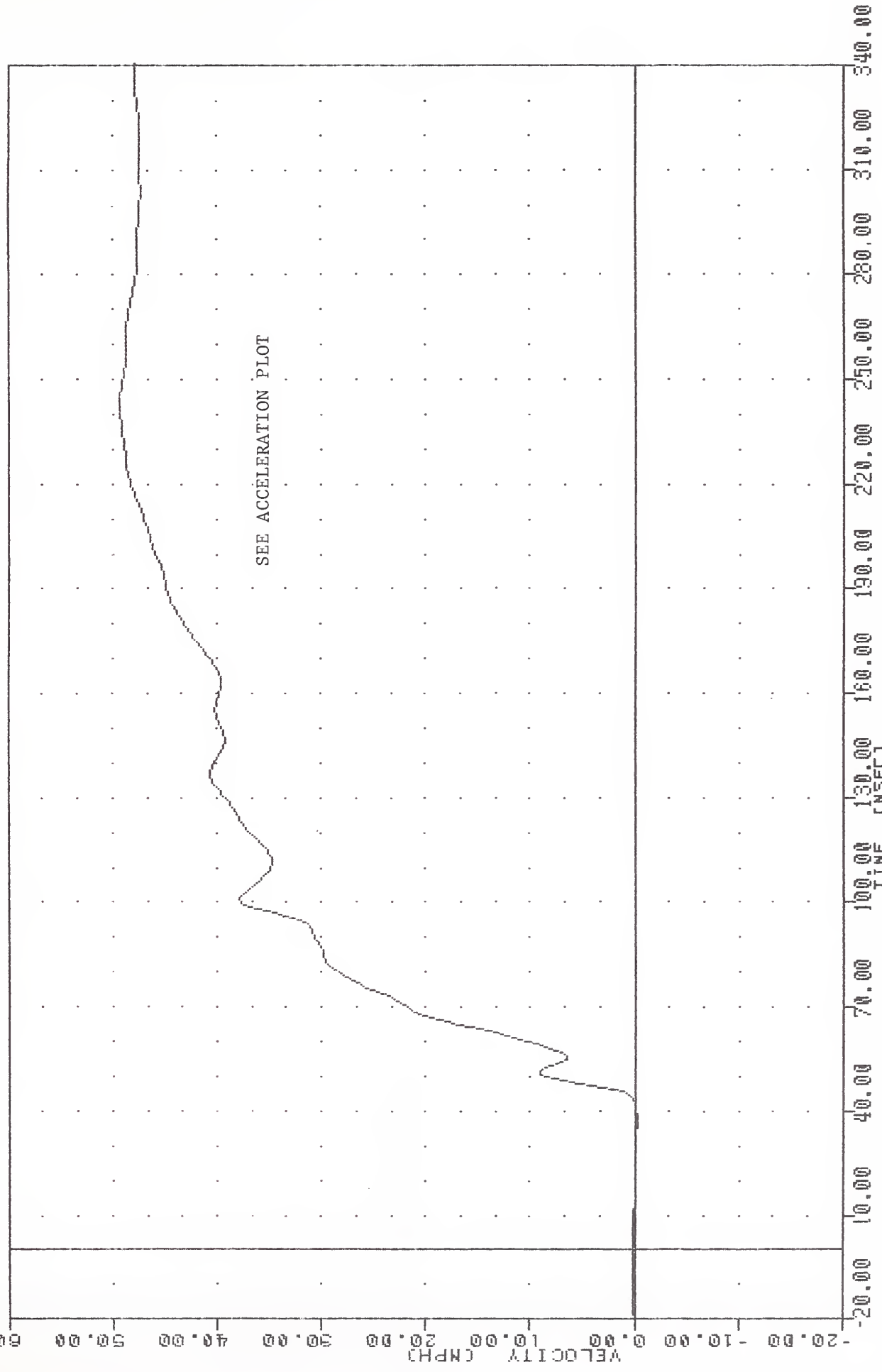
PLOT DATE 17-OCT-84 10:13:38

FILTER = HSR 136/ 189/ -50
 MIN. MAX VALUES = -42.71e 52.50, 90.63 e 47.50



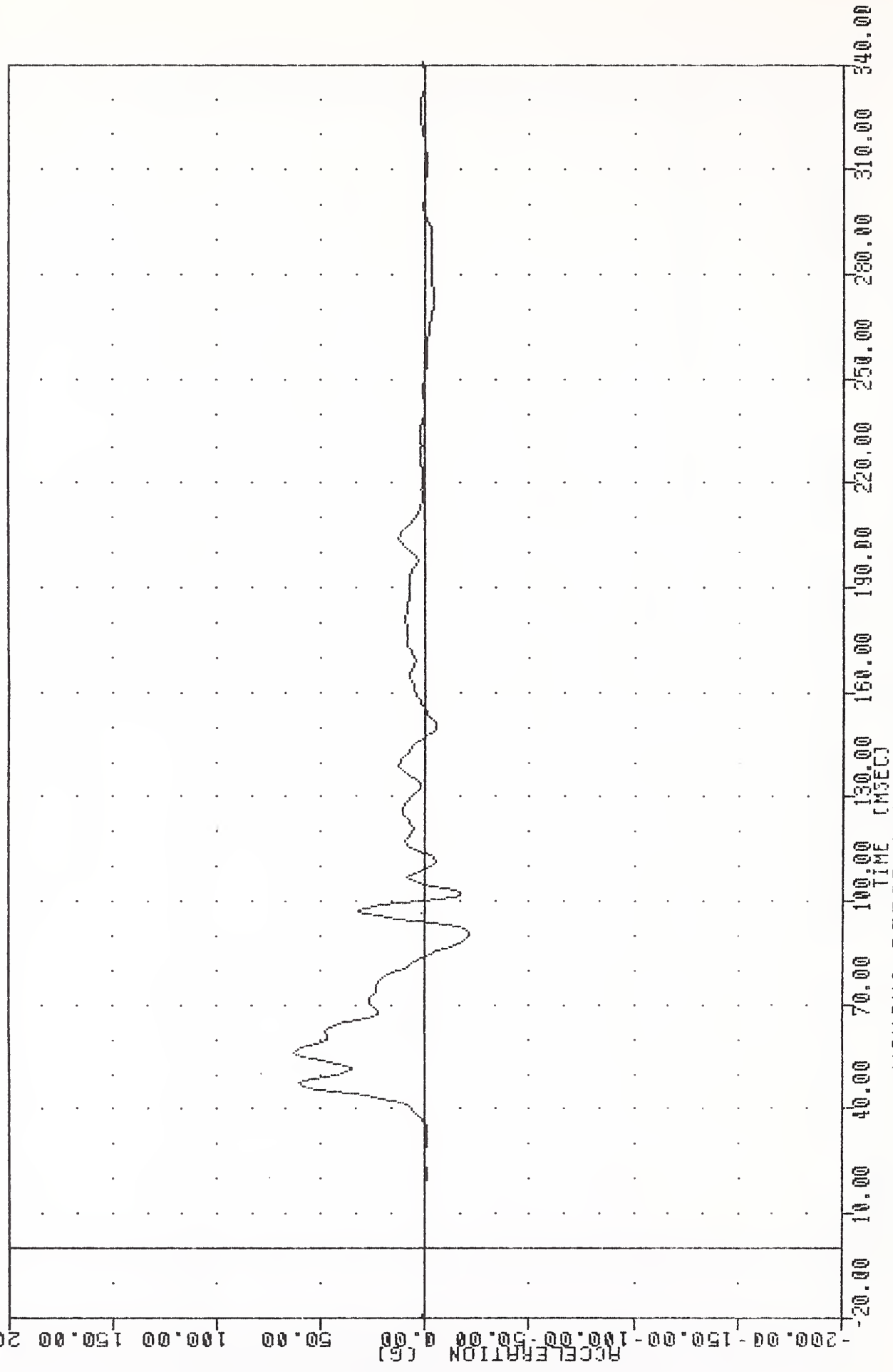
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LEFT UPPER RIB ACCELERATION #2 Y AXIS

TRC .841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LURYVA
 PLOT DATE 17-OCT-84 10:15:20
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.35g 36.88 , 49.26 g 242.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LURYGA

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LLAG61
 PLUT DATE 17-OCT-84 10:13:38
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -21.28 90.00, 63.18 55.63



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LEFT LOWER RIB ACCELERATION Y AXIS

TRC , 841008

PLUT DATE 17-OCT-84 10:15:20

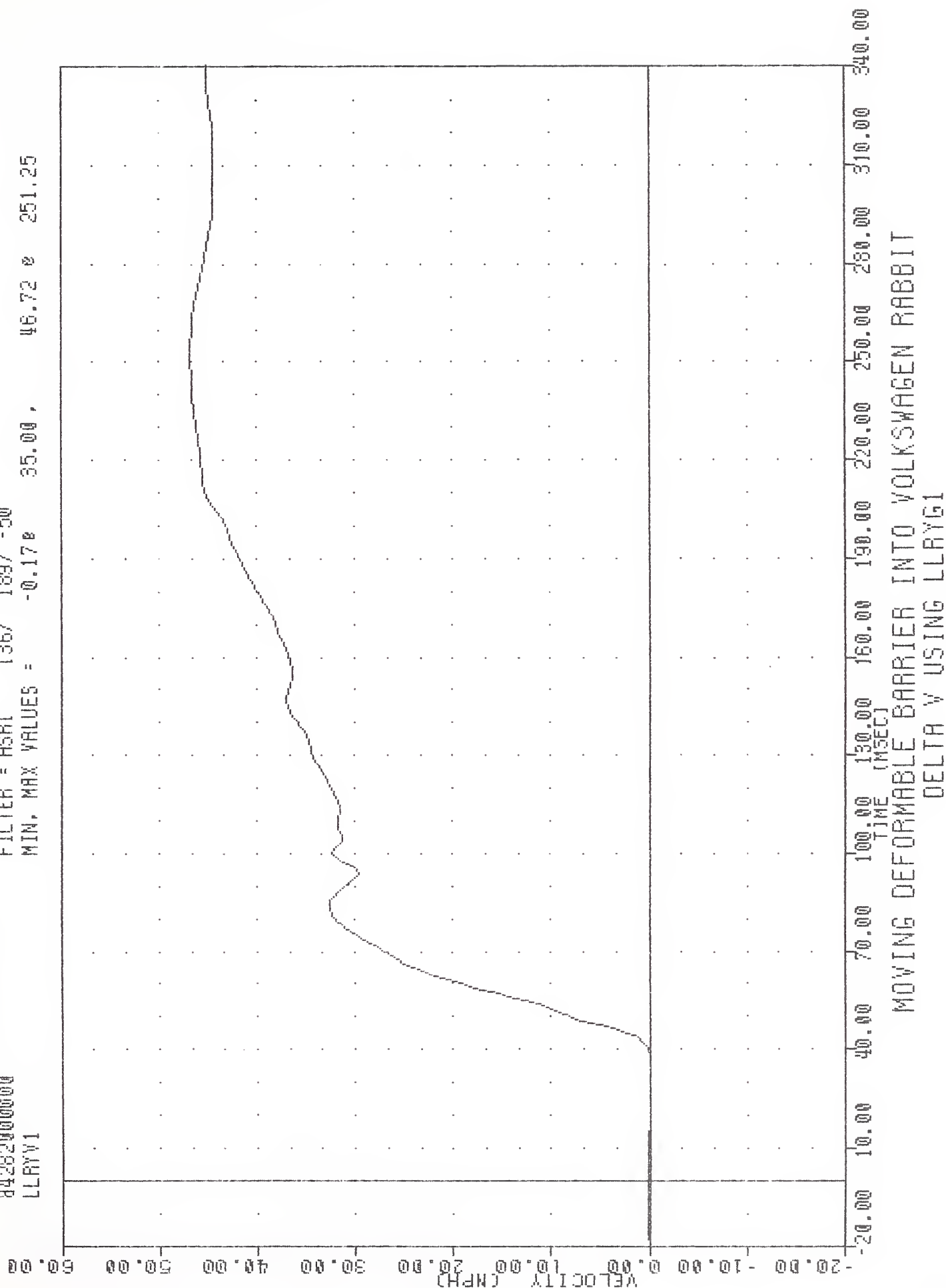
SIDE AGGRESSIVE ATTRIBUTES

842820000000

LLRYV1

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.170 35.00, 46.72 0 251.25

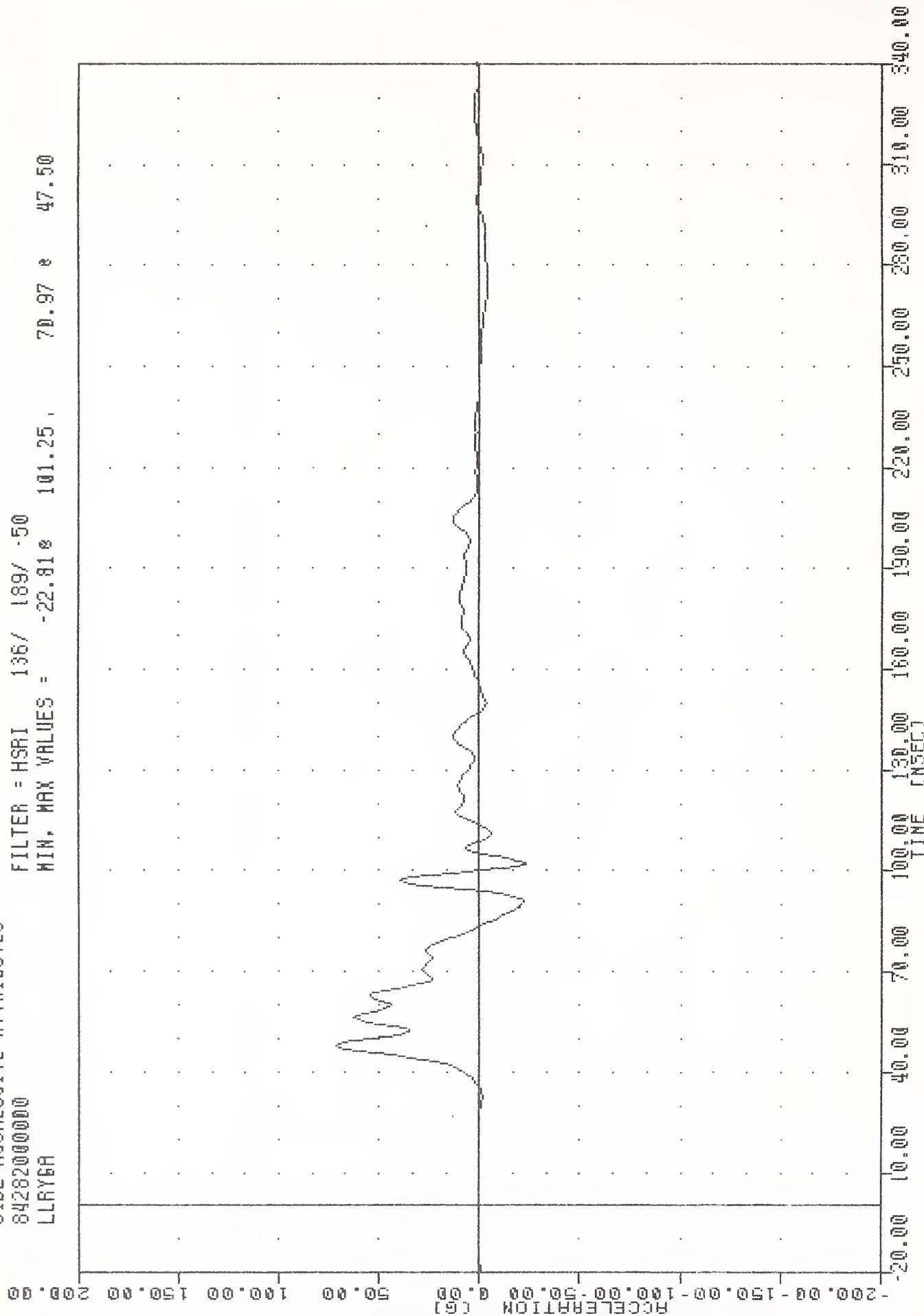


TAC , 841008 PLOT DATE 17-OCT-84 10:13:38

SIDE AGGRESSIVE ATTRIBUTES

84282000000 FILTER = HSRI 136/ 189/ -50

LLRY6A MIN. MAX VALUES = -22.81g 101.25 , 70.97 g 47.50

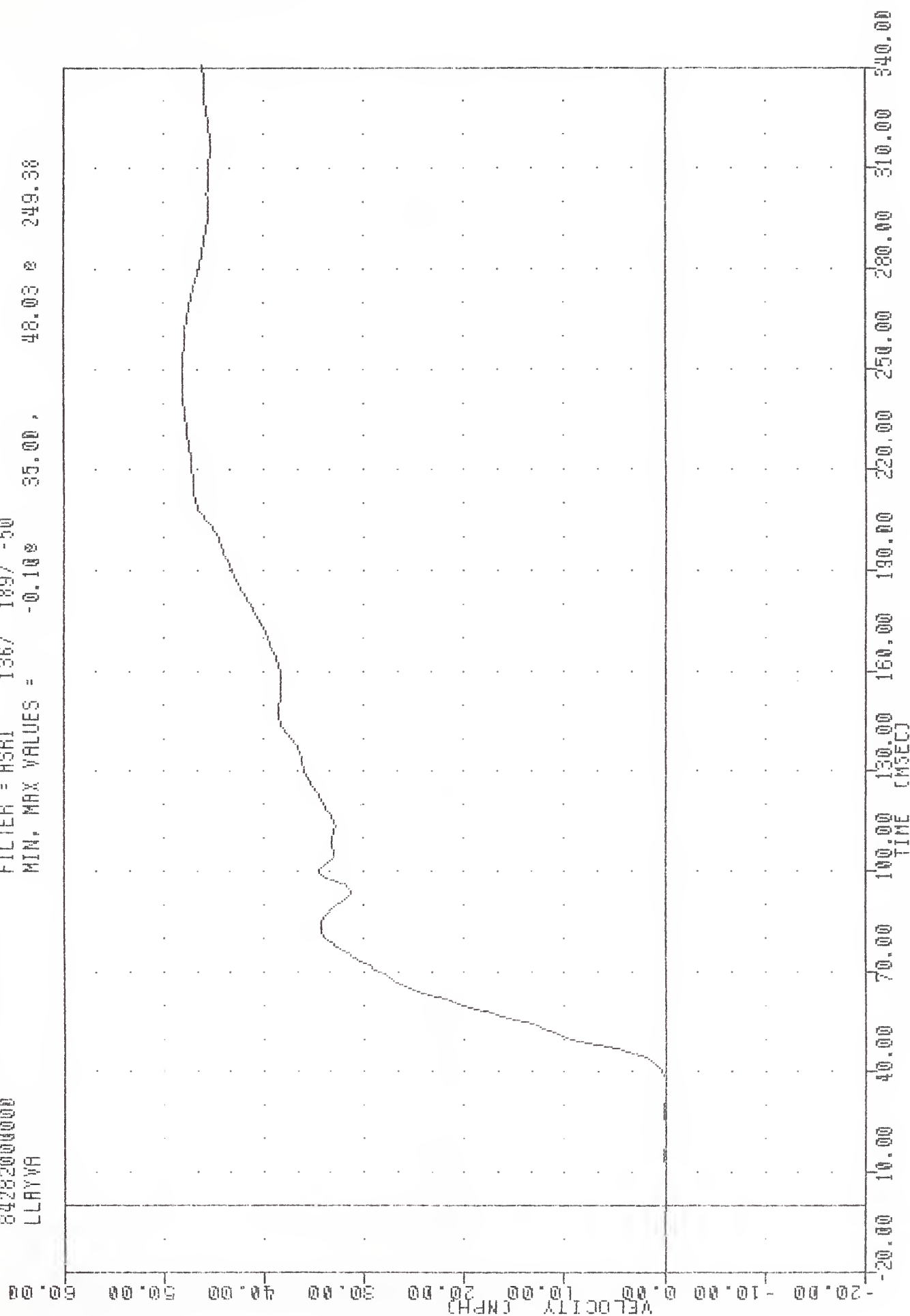


TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LLAYVA

PLOT DATE 17-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.100 35.00, 48.03 @ 249.38



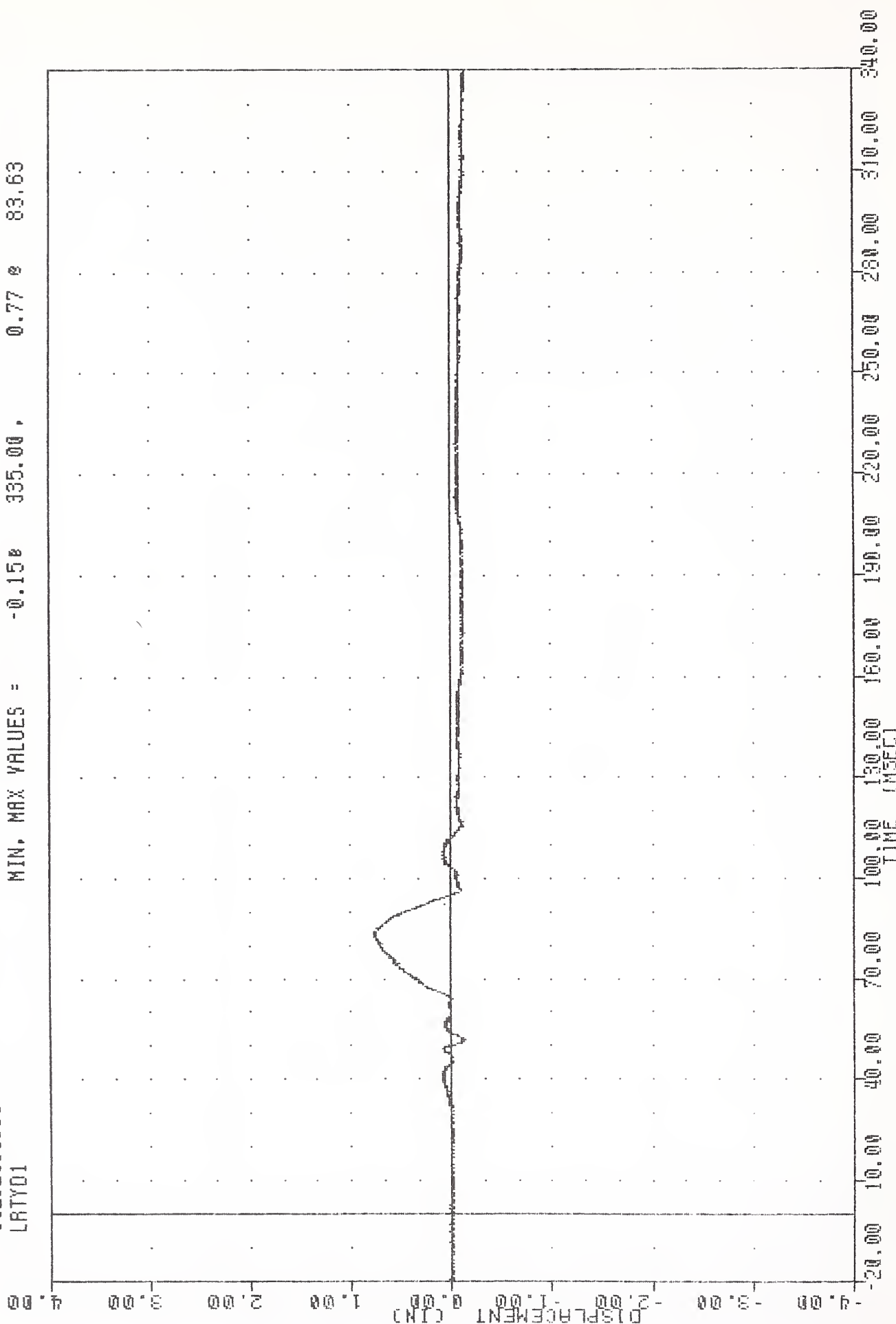
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LLAYVA

THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
LRTYD1

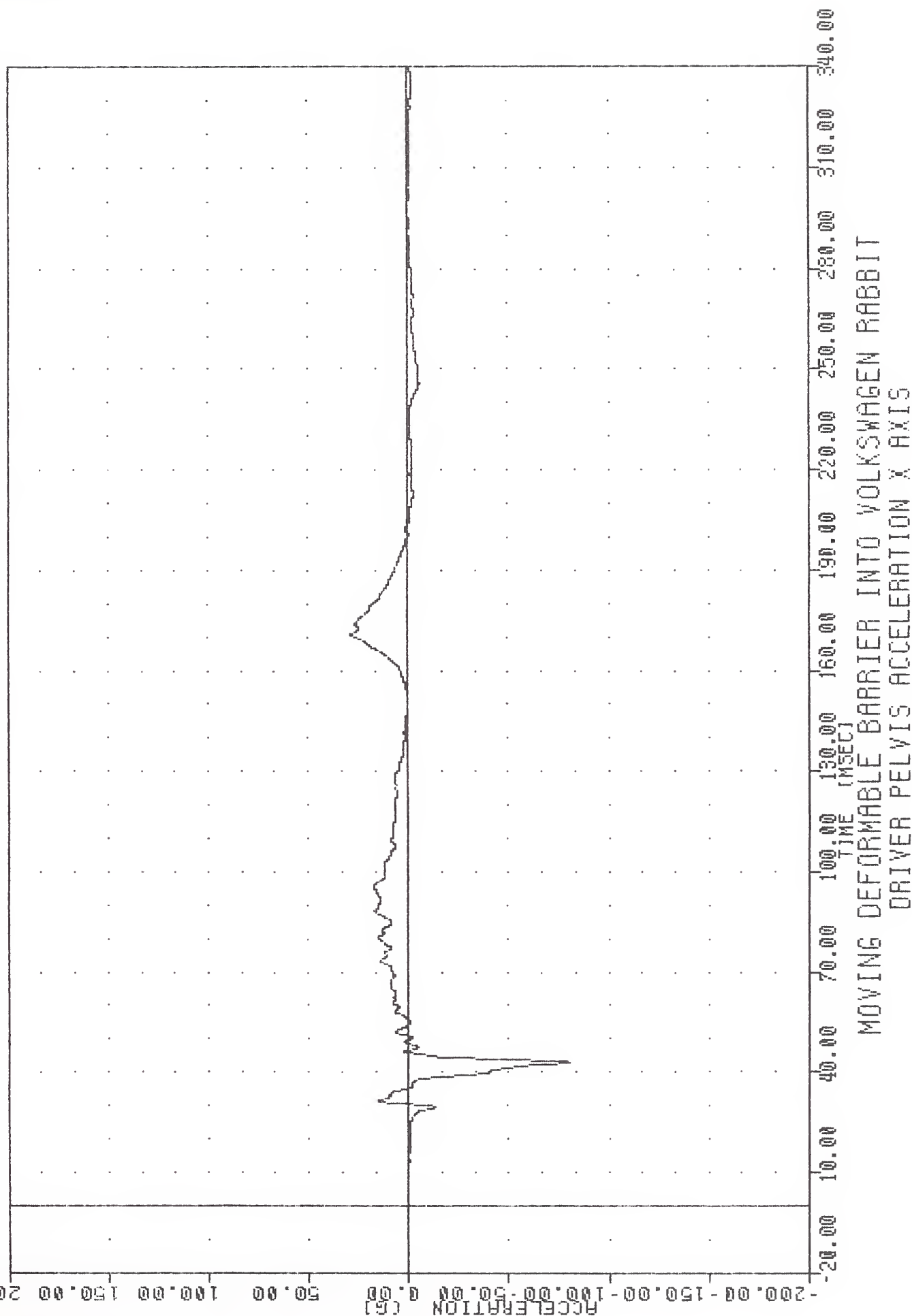
PLU1 DATE 17-OCT-84 10:12:38

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -0.150 335.00, 0.77 83.63



TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 PEVXG1
 PLOT DATE 17-OCT-84 10:12:38
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -80.41e 42.88 , 28.49 e 170.50



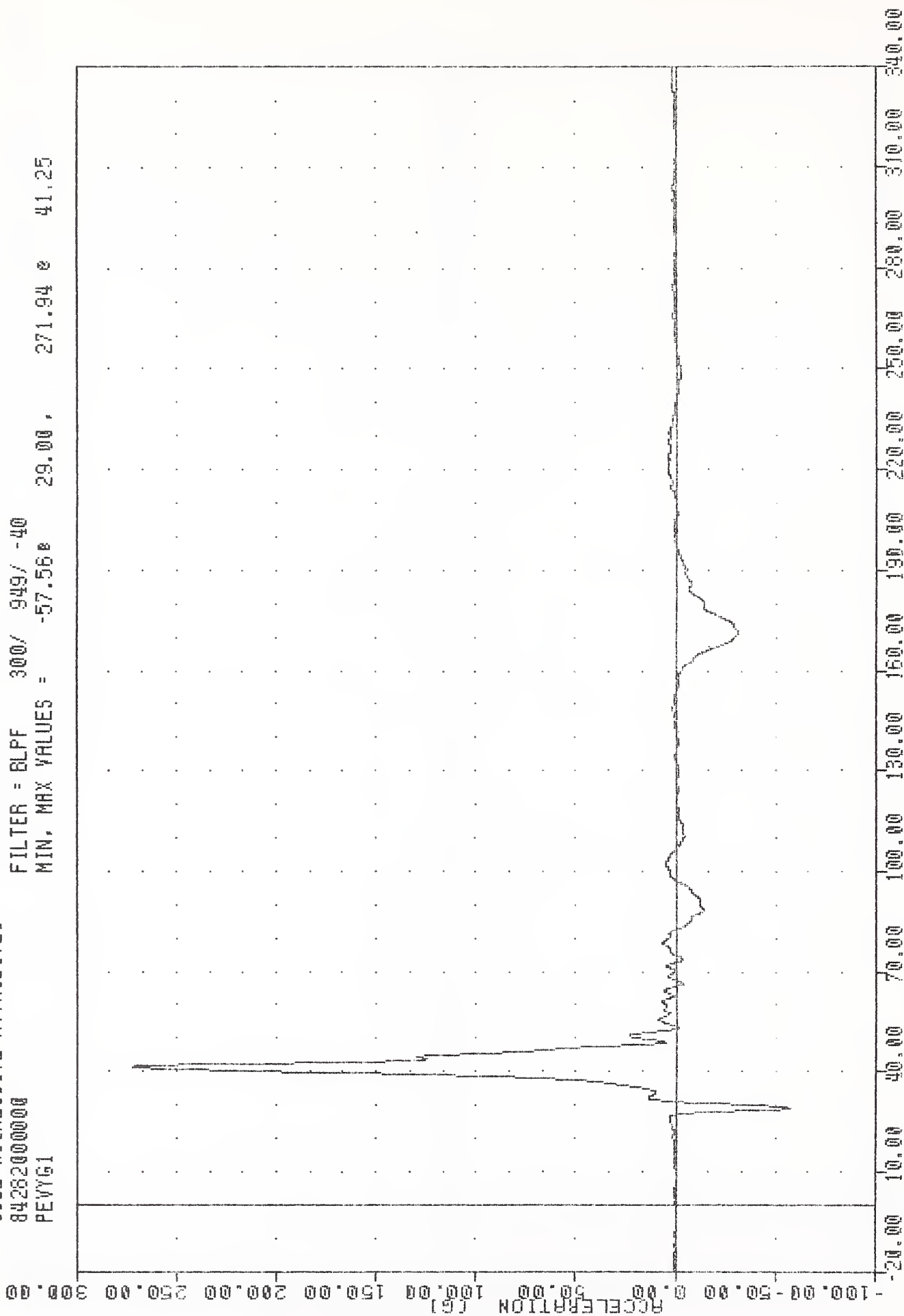
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS ACCELERATION X AXIS

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 PEVYG1

PLOT DATE 18-OCT-84 16:14:32

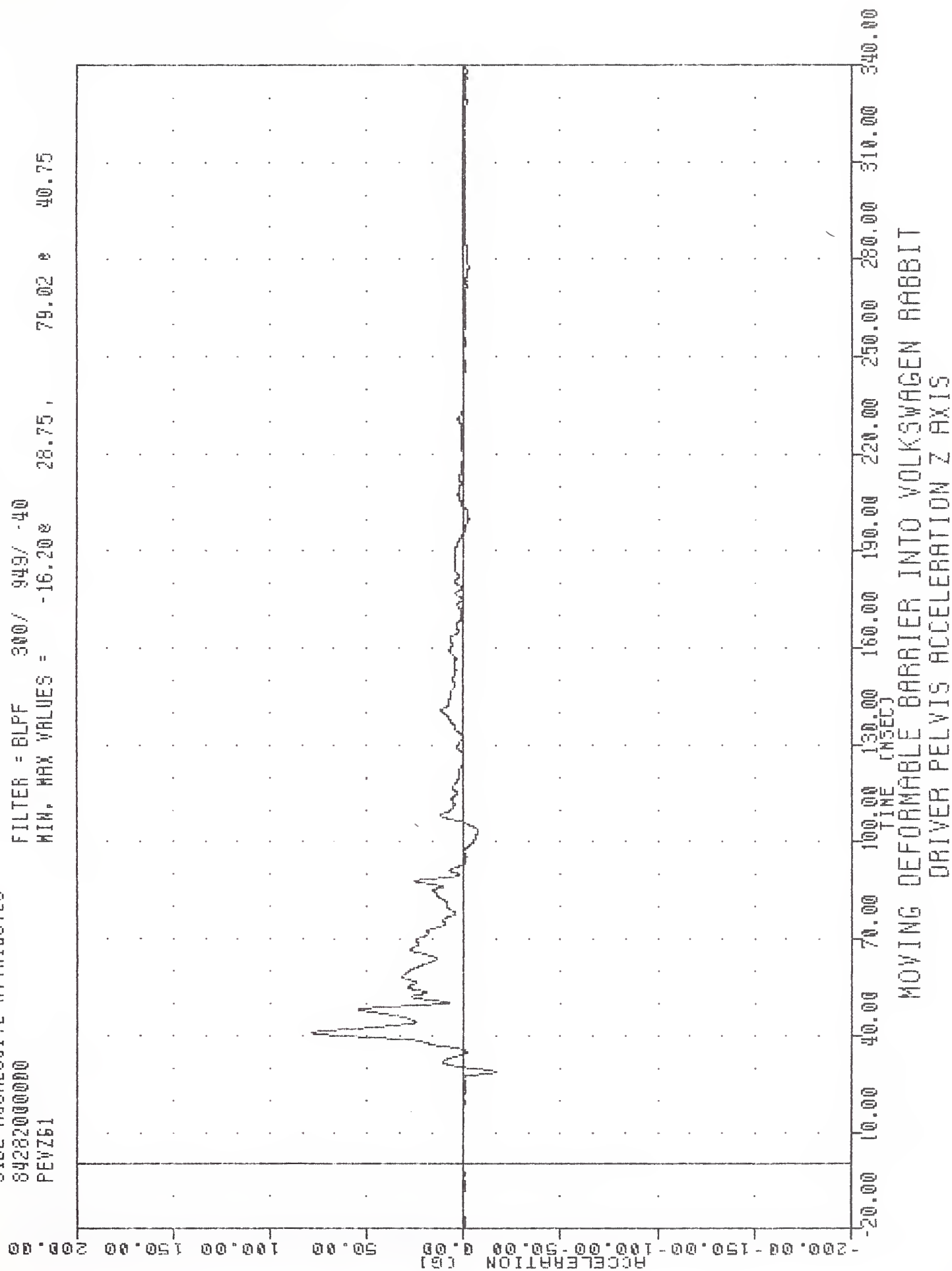
FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -57.56 29.00, 271.94 41.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS ACCELERATION Y AXIS

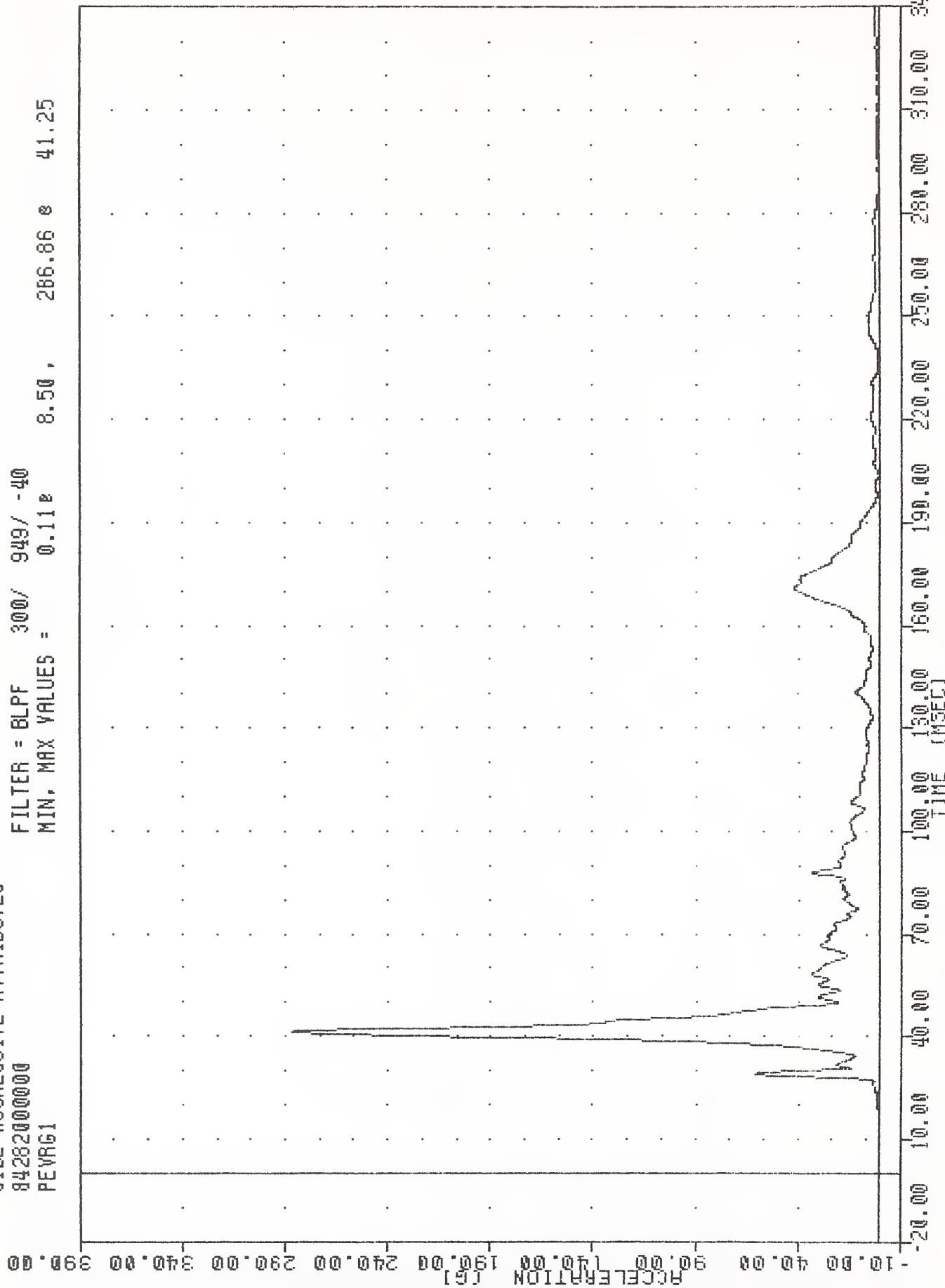
THU 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 PEVZ61
 PLUI DATE 17-OCT-84 10:12:38
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -16.20e 28.75, 79.02 e 40.75



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS ACCELERATION Z AXIS

IHC
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 PEVRG1
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.11e 8.50, 286.86 e 41.25

PLOT DATE 17-JUL-84 10:12:38



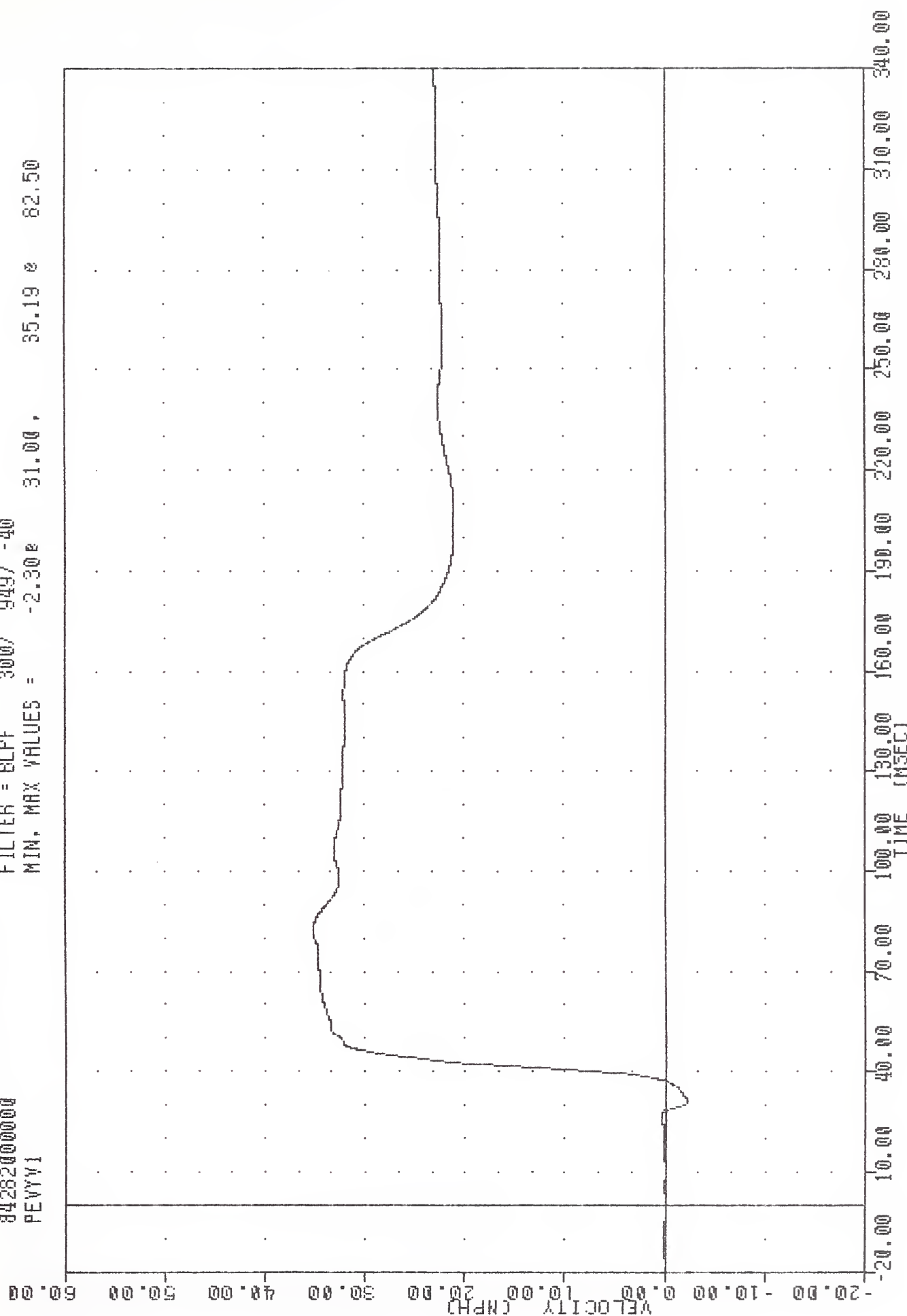
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS RESULTANT

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 PEVY1

PLU1 DATE 17-UCT-84 10:16:18

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -2.30e 31.00, 35.19 e 82.50

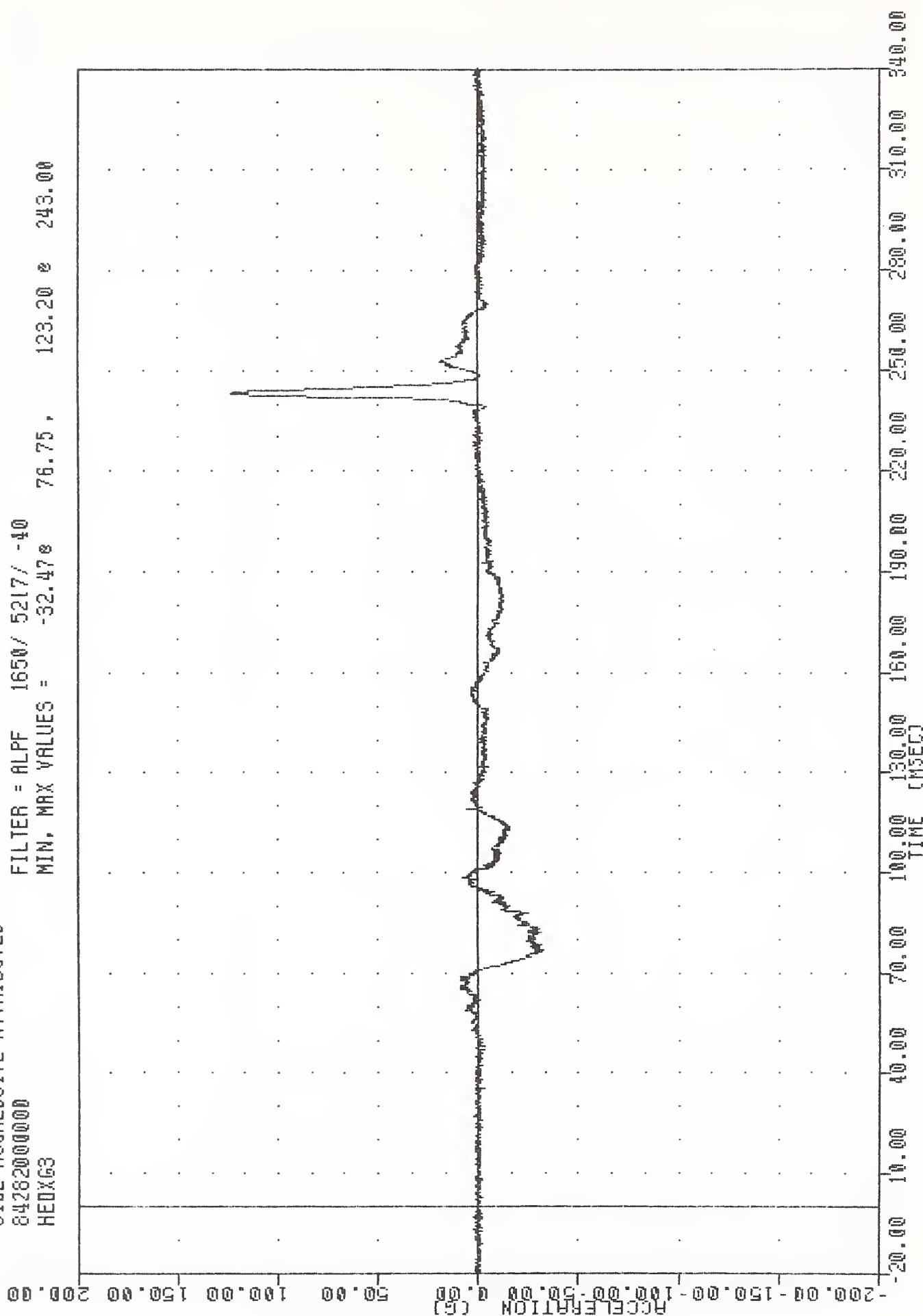


THC 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
HEDX63

PLU1 DATE 1/-UCT-84 10:12:38

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -32.478 76.75, 123.20 8 243.00



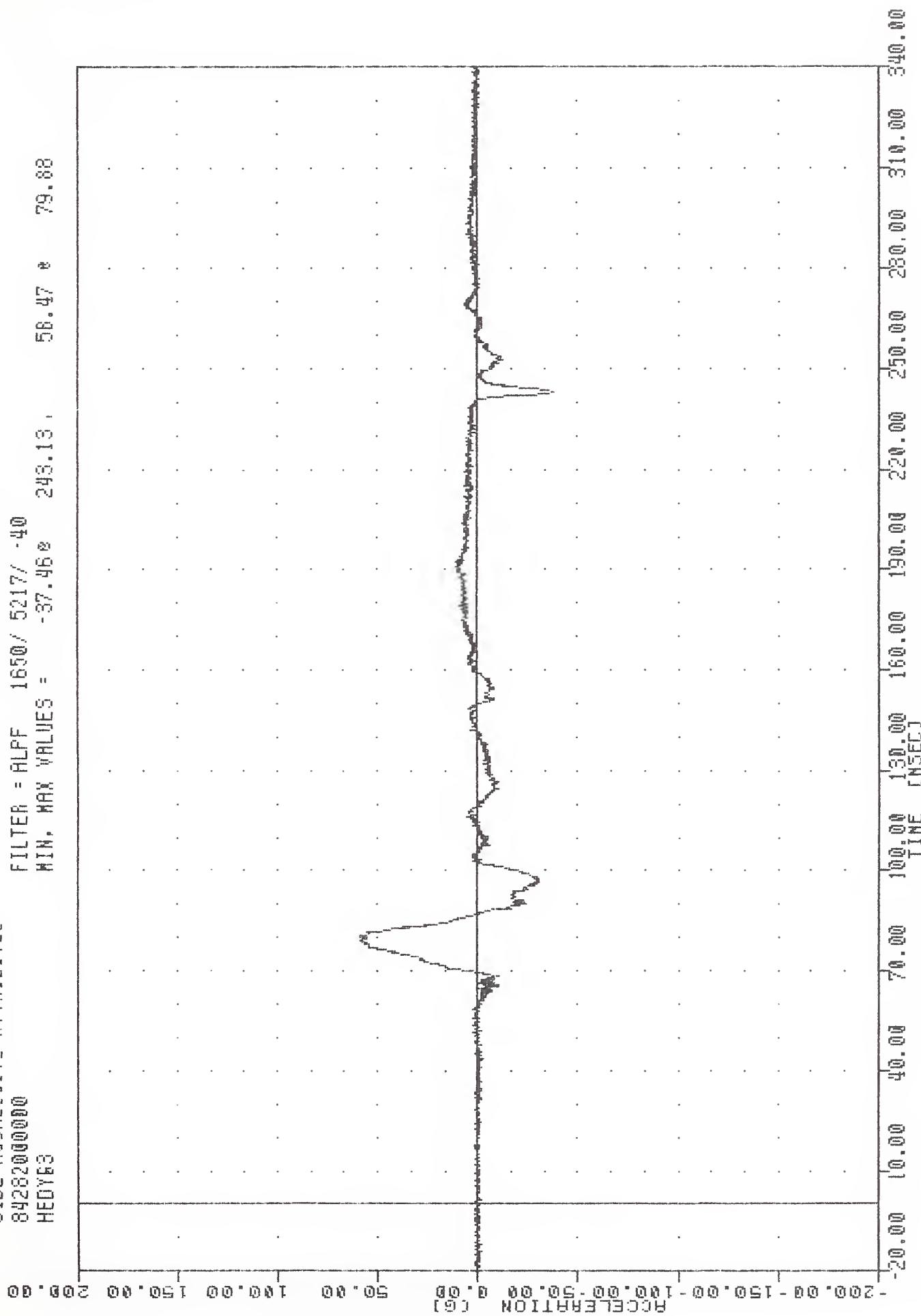
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION X AXIS

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
HEDY63

PLU1 DATE 17-OCT-84 10:12:38

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -37.46e 243.13, 58.47 e 79.88



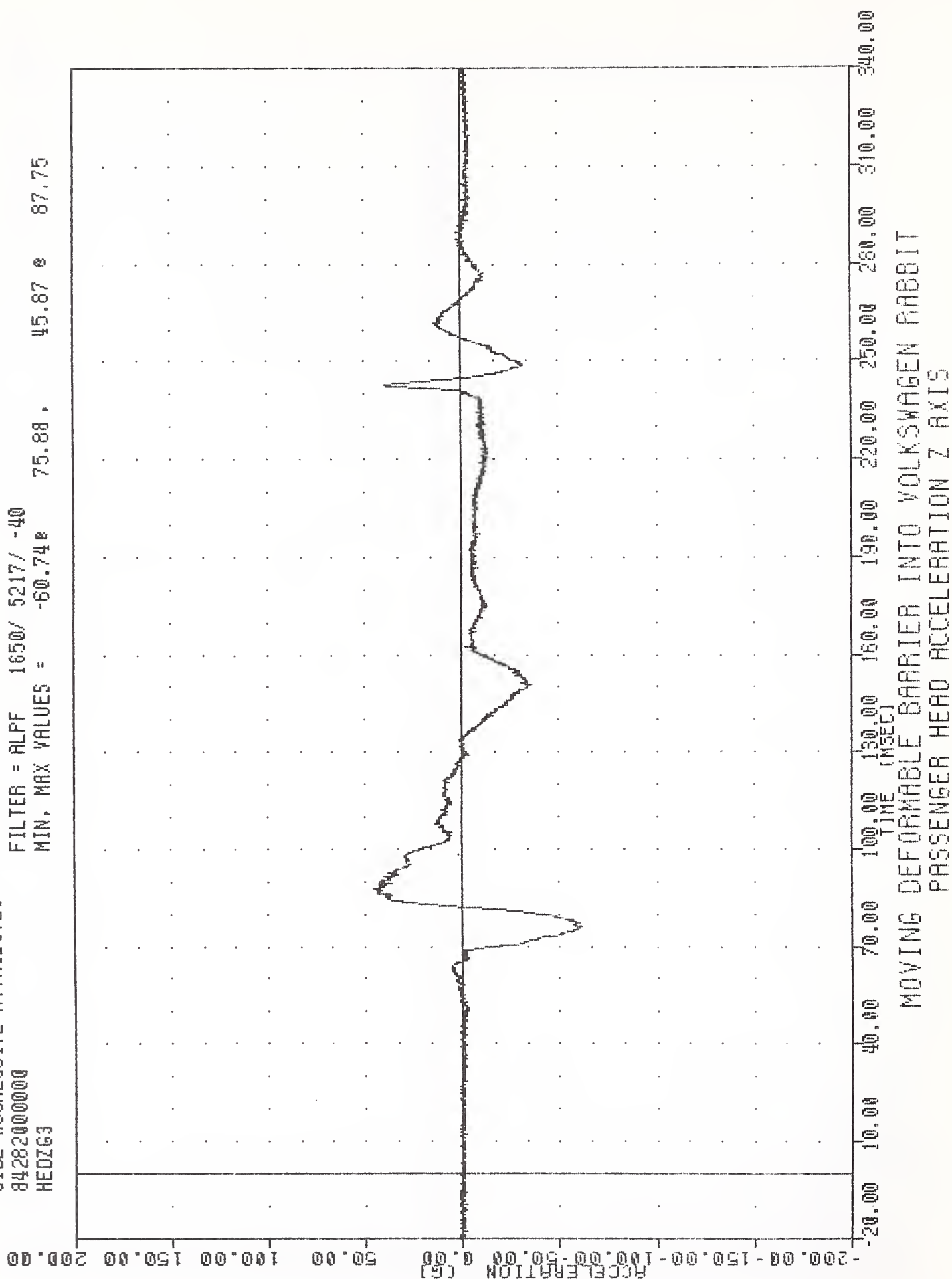
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Y AXIS

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
HEDZG3

PLUI DATE 17-OCT-84 10:12:38

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -60.74 75.88 , 45.87 87.75



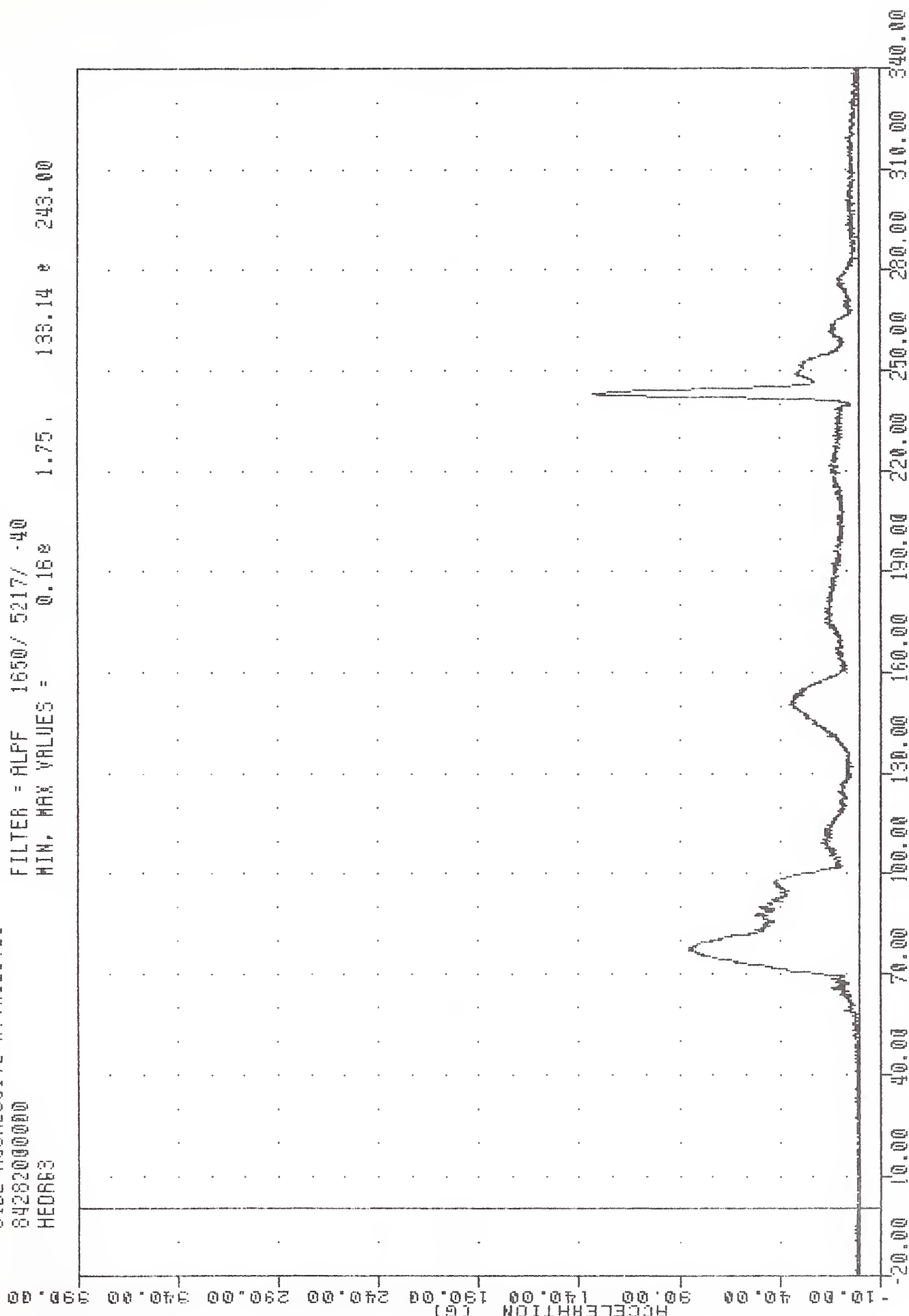
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Z AXIS

THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
HEAD63

PLOT DATE 17-OCT-84 10:12:38

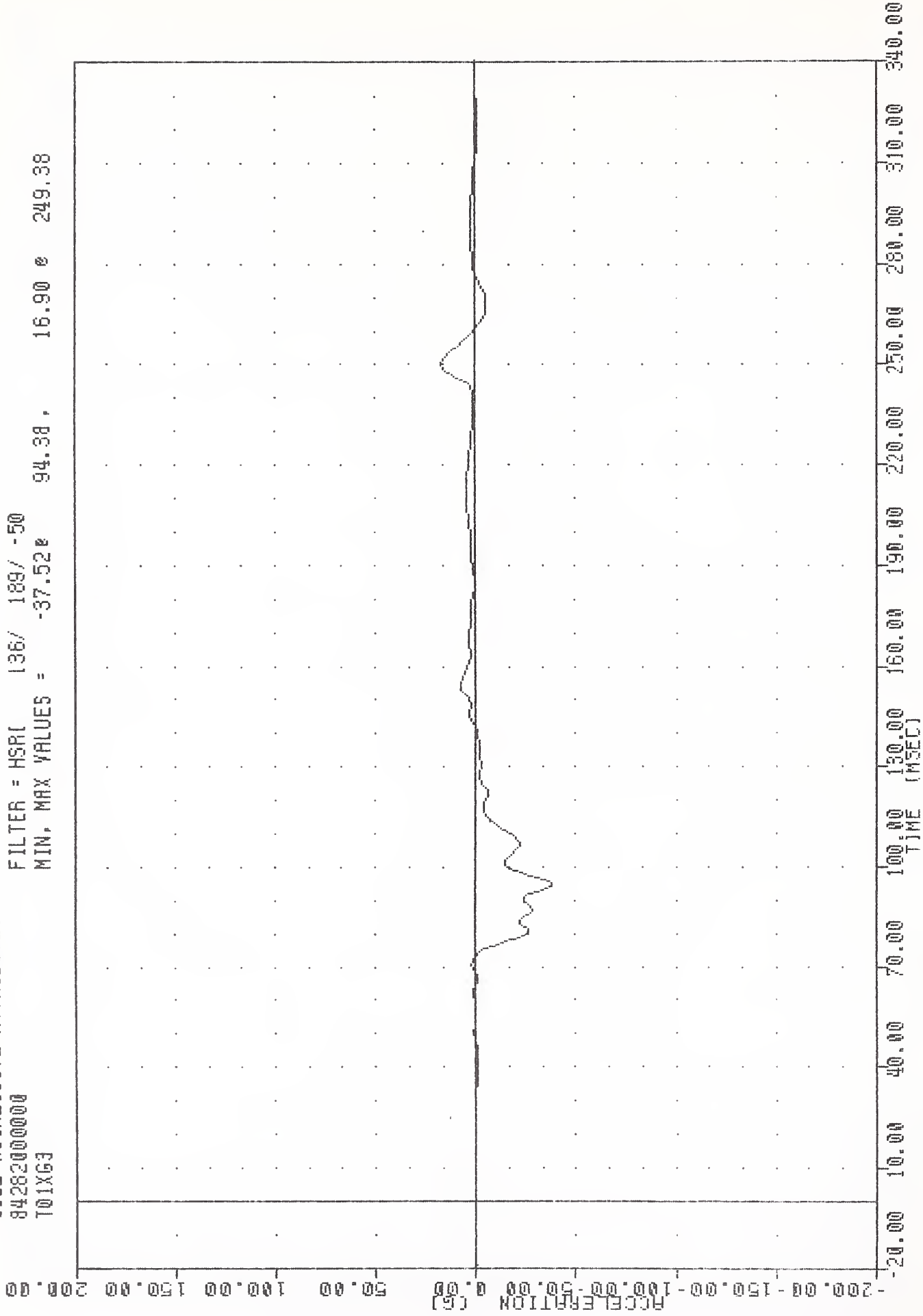
FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = 0.168 1.75, 133.14 e 243.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD RESULTANT

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01X63
 PLOT DATE 17-OCT-84 10:13:38
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -37.52e 94.38 , 16.90 e 249.38



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER UPPER SPINE ACCELERATION X AXIS

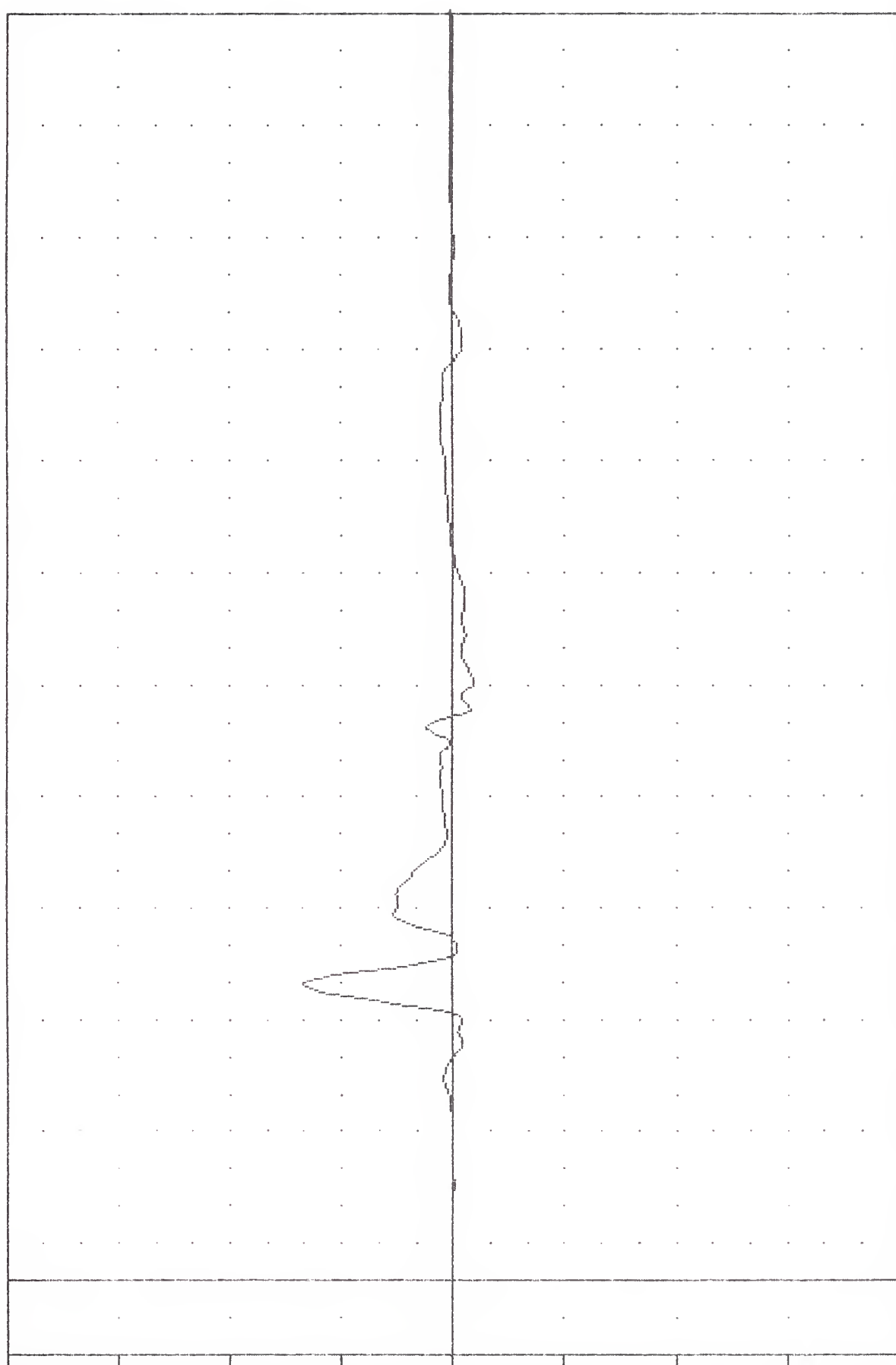
TRC , 841008 PLOT DATE 17-OCT-84 10:13:38

SIDE AGGRESSIVE ATTRIBUTES

842820000000 FILTER = HSRI 136/ 189/ -50

T01Y63 MIN, MAX VALUES = -9.32e 160.63, 67.58 e 78.75

ACCELERATION [G]



-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION Y AXIS

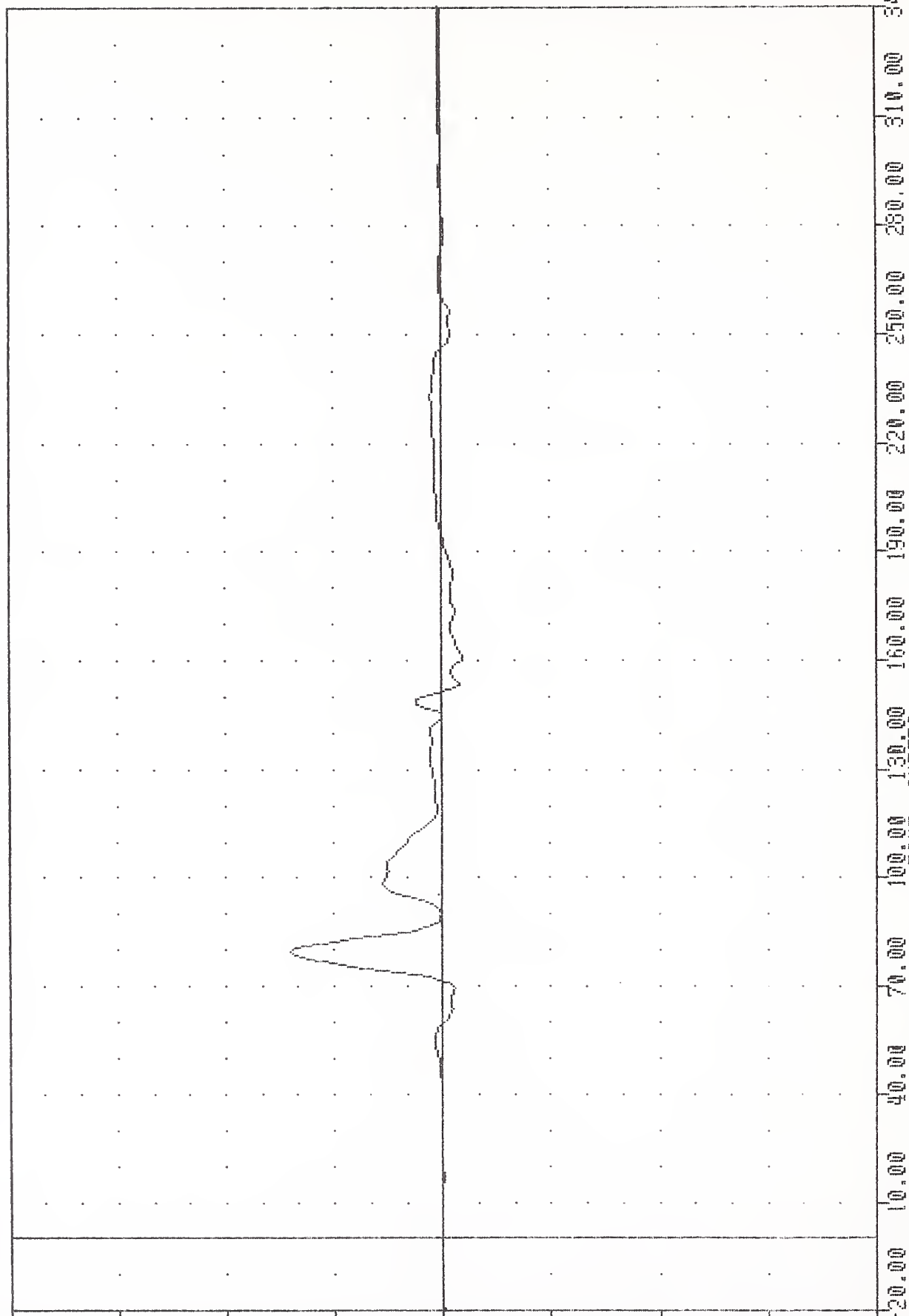
TAC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
T01Y6C

PLUT DATE 17-UCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -9.27e 160.63 , 69.90 e 78.75

ACCELERATION [G]



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS

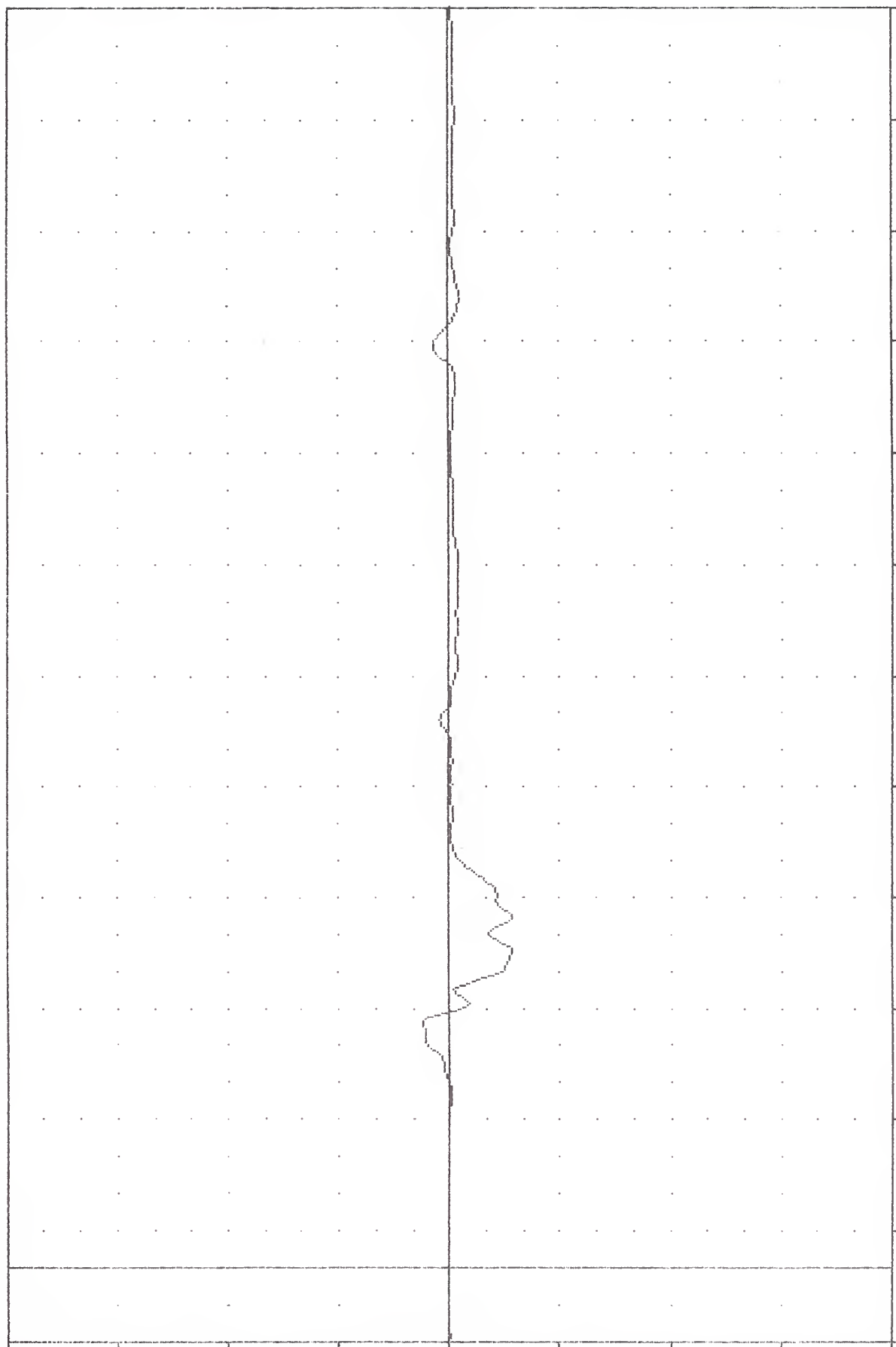
TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
T01ZG3

PLUG DATE 17-UCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -28.69e 84.38, 11.85 e 65.00

ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION Z AXIS

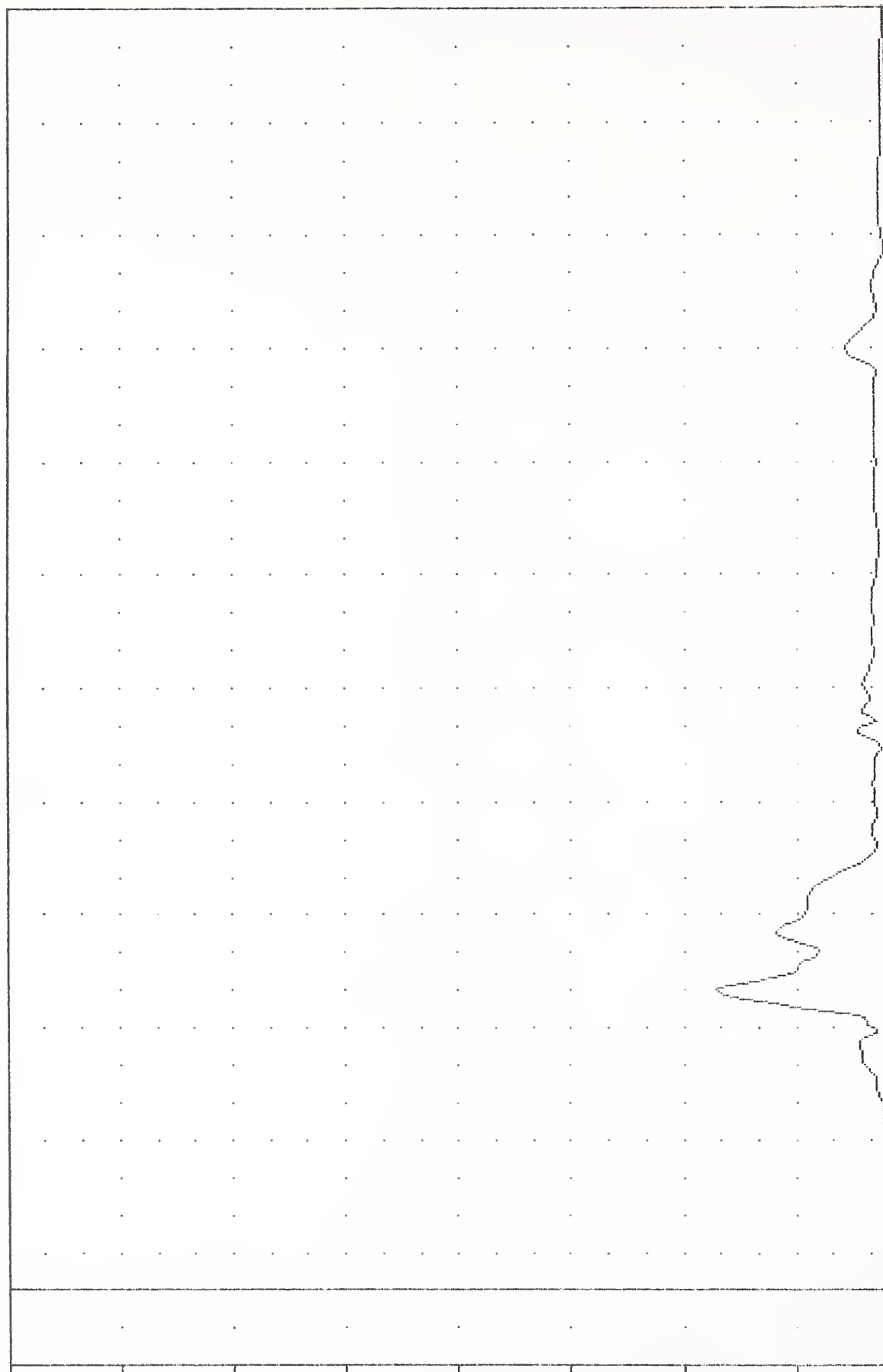
TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01R63

PLUT DATE 17-OCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = 0.08e -17.50 , 75.52 e 79.38

ACCELERATION (G)



-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

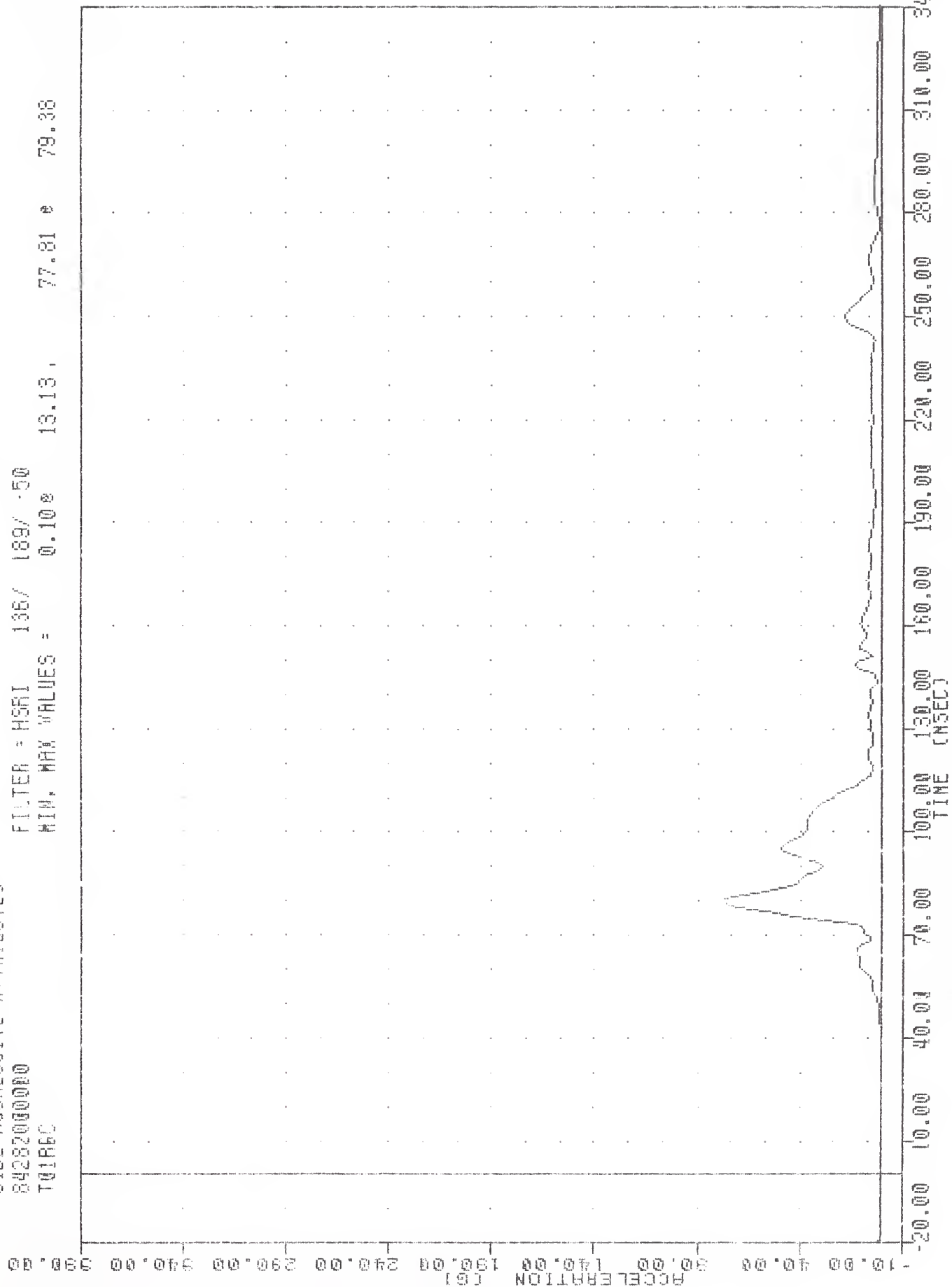
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER UPPER SPINE RESULTANT

TRC 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01R6C

PLOT DATE 17-OCT-84 10:14:56

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.10e 13.13, 77.81 e 79.38



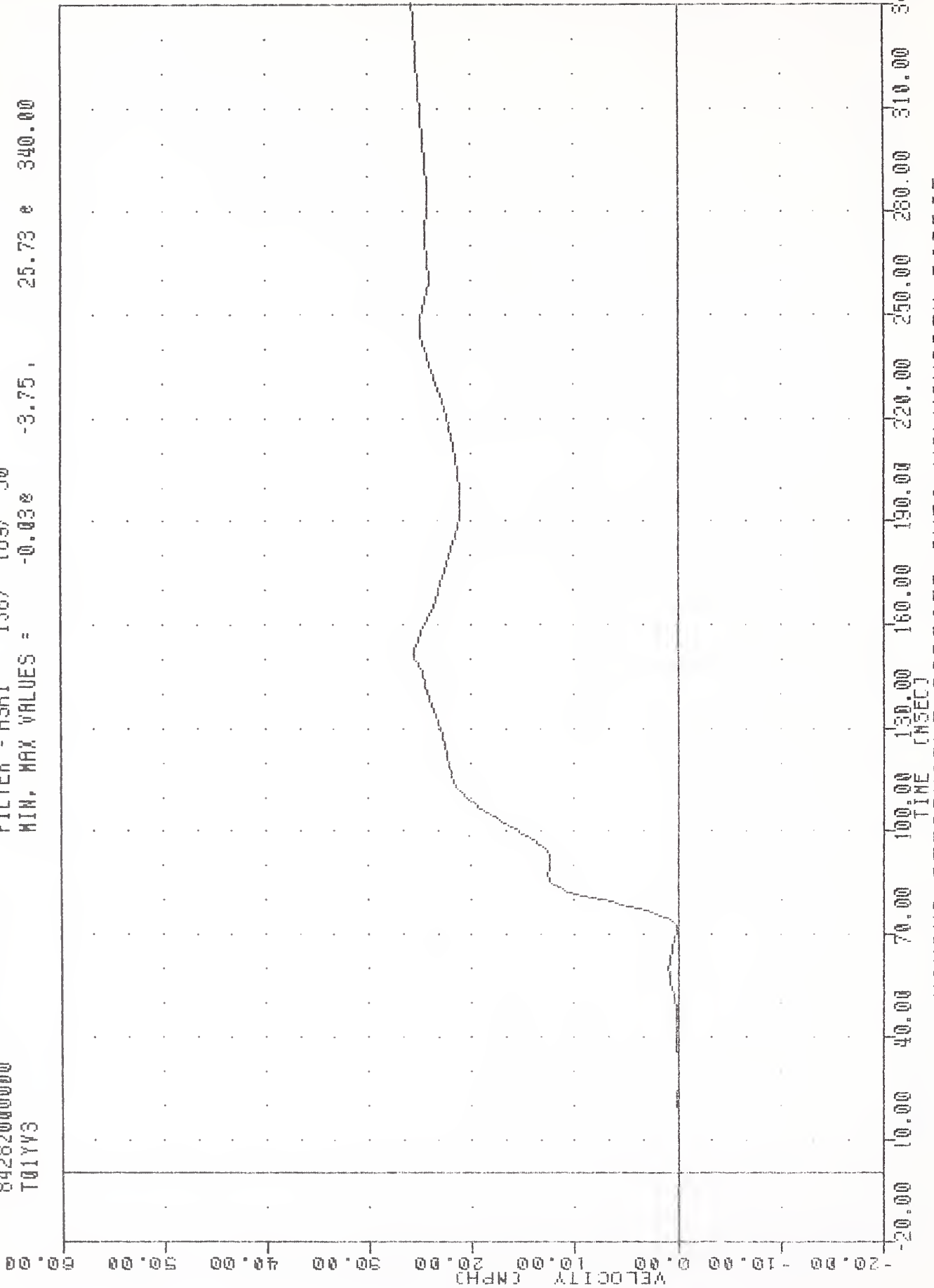
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER UPPER SPINE RESULTANT USING T01YGC

THC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01YV3

PLU1 DATE 17-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.038 -3.75 , 25.73 e 340.00



B-46

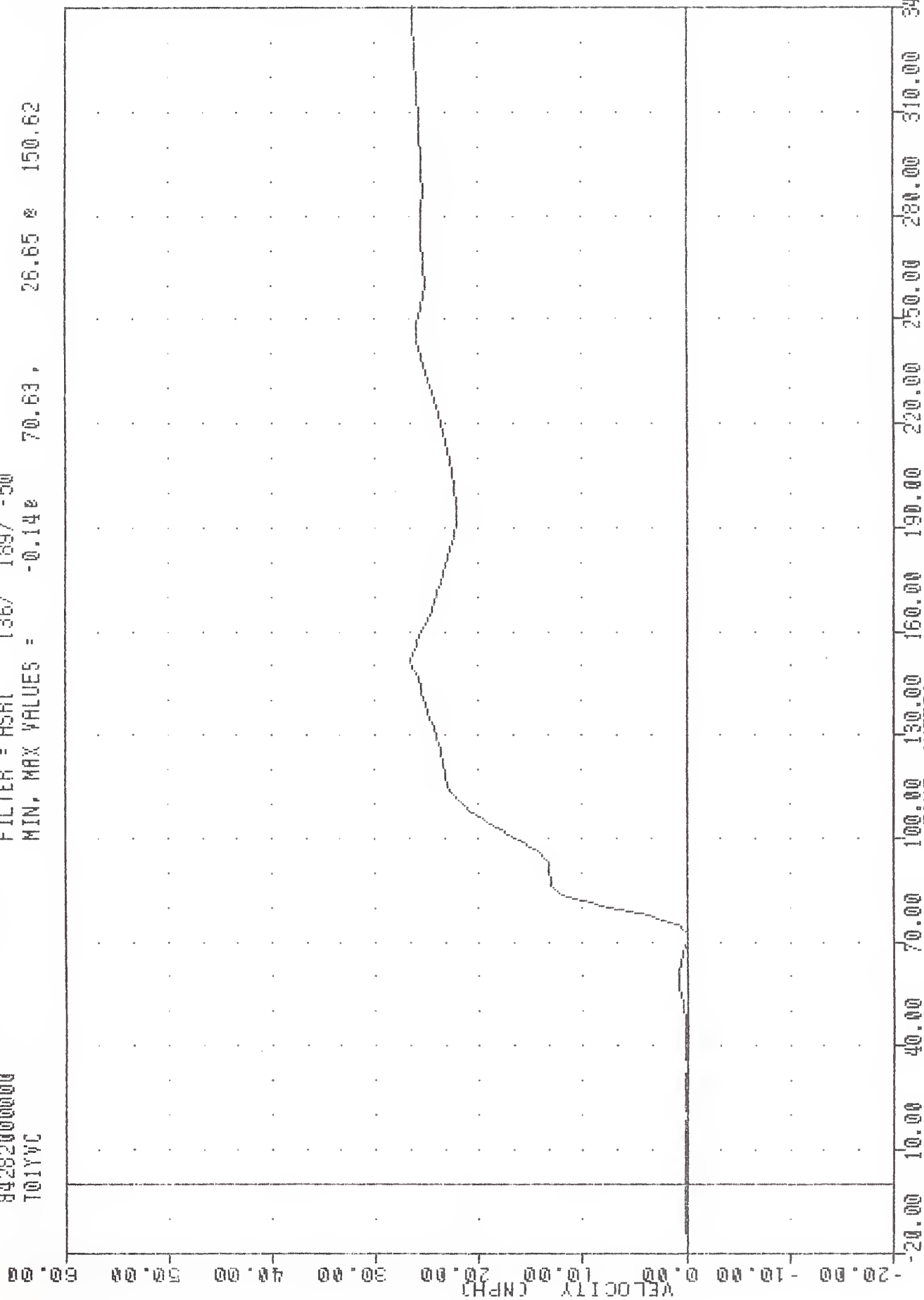
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T01YV3

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T01YVC

PLU1 DATE 17-OCT-84 10:15:20

FILTER = HSRL 136/ 189/ -50

MIN, MAX VALUES = -0.14e 70.63, 26.65 e 150.62



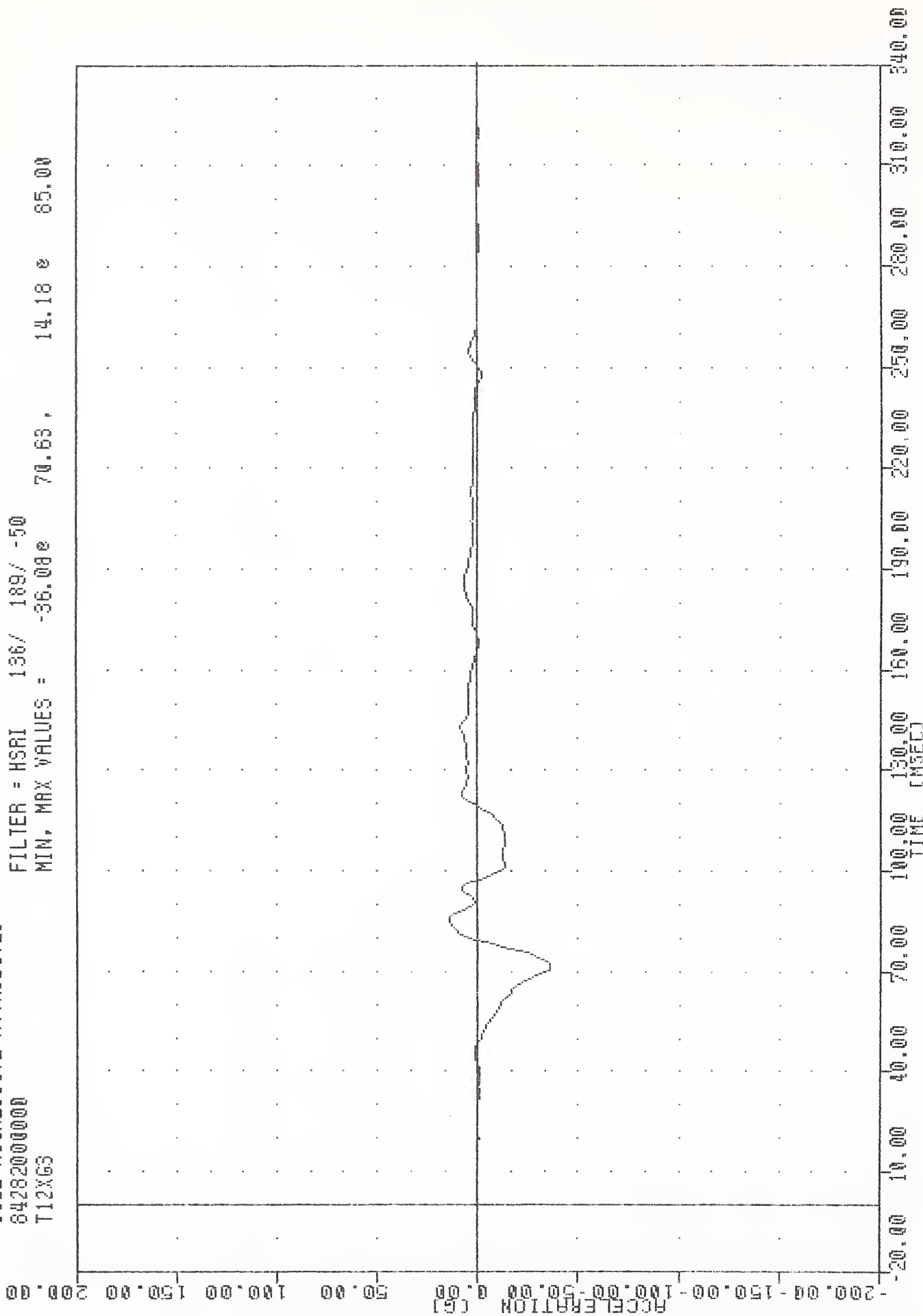
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T01YGC

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T12XG3

PLOT DATE 17-OCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -36.00e 70.63, 14.18 e 85.00



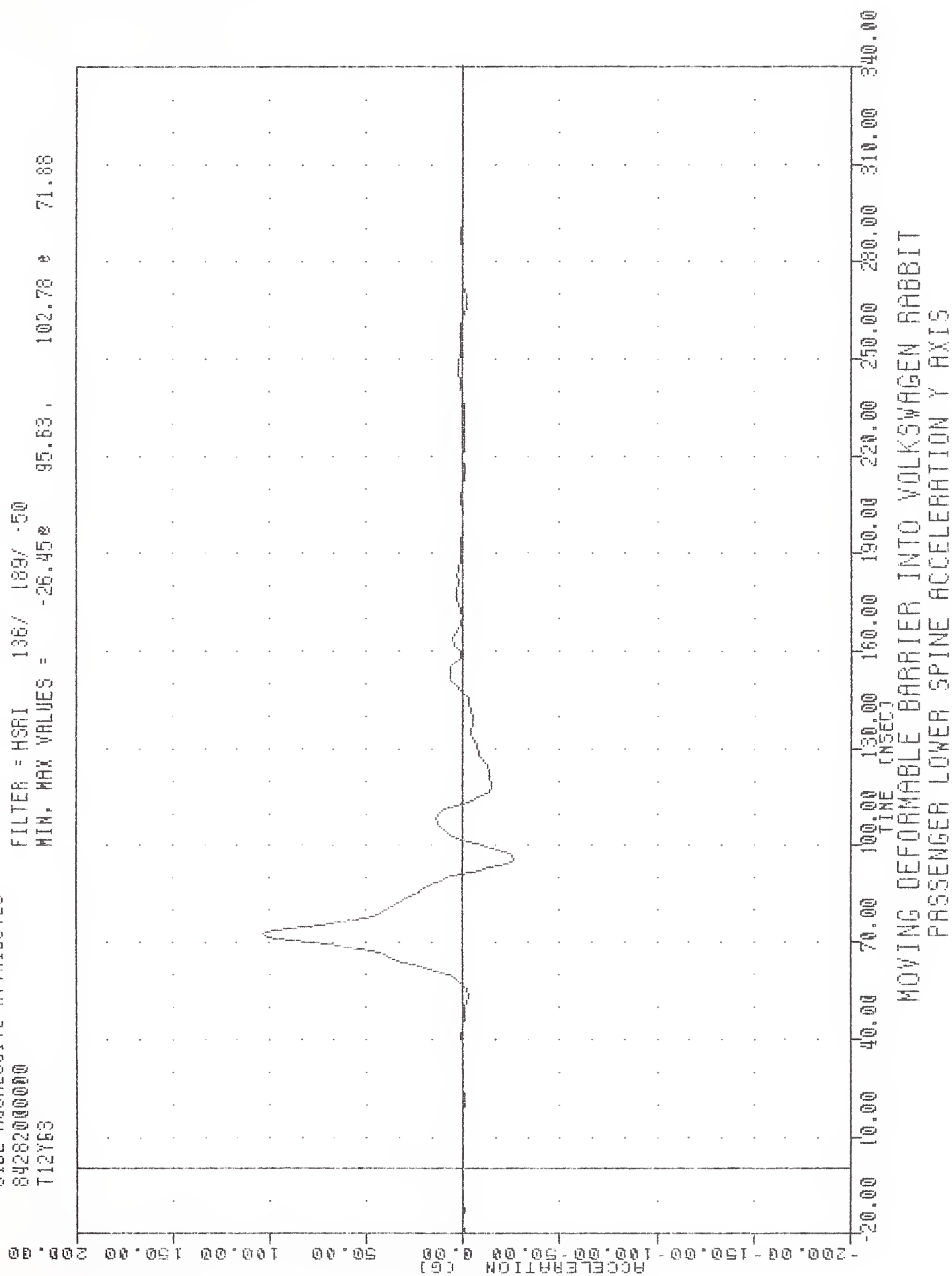
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION X AXIS

TAC , 841003
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T12Y63

PLOT DATE 17-OCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -26.45e 95.63 , 102.78 e 71.88



THC , 841008 PLOT DATE 17-OCT-84 10:13:38

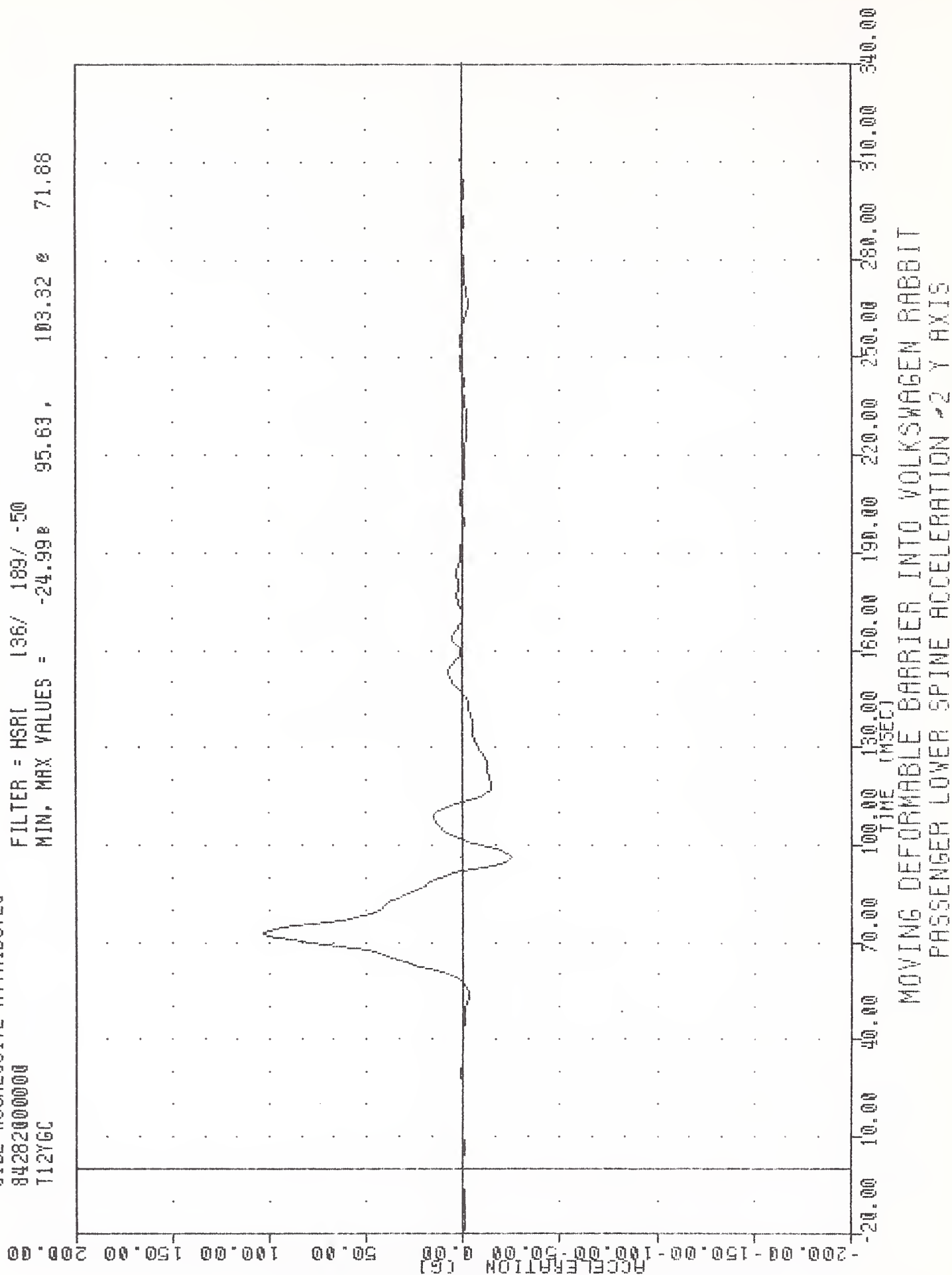
SIDE AGGRESSIVE ATTRIBUTES

84282000000

112YGC

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -24.99 95.63 , 103.32 71.88

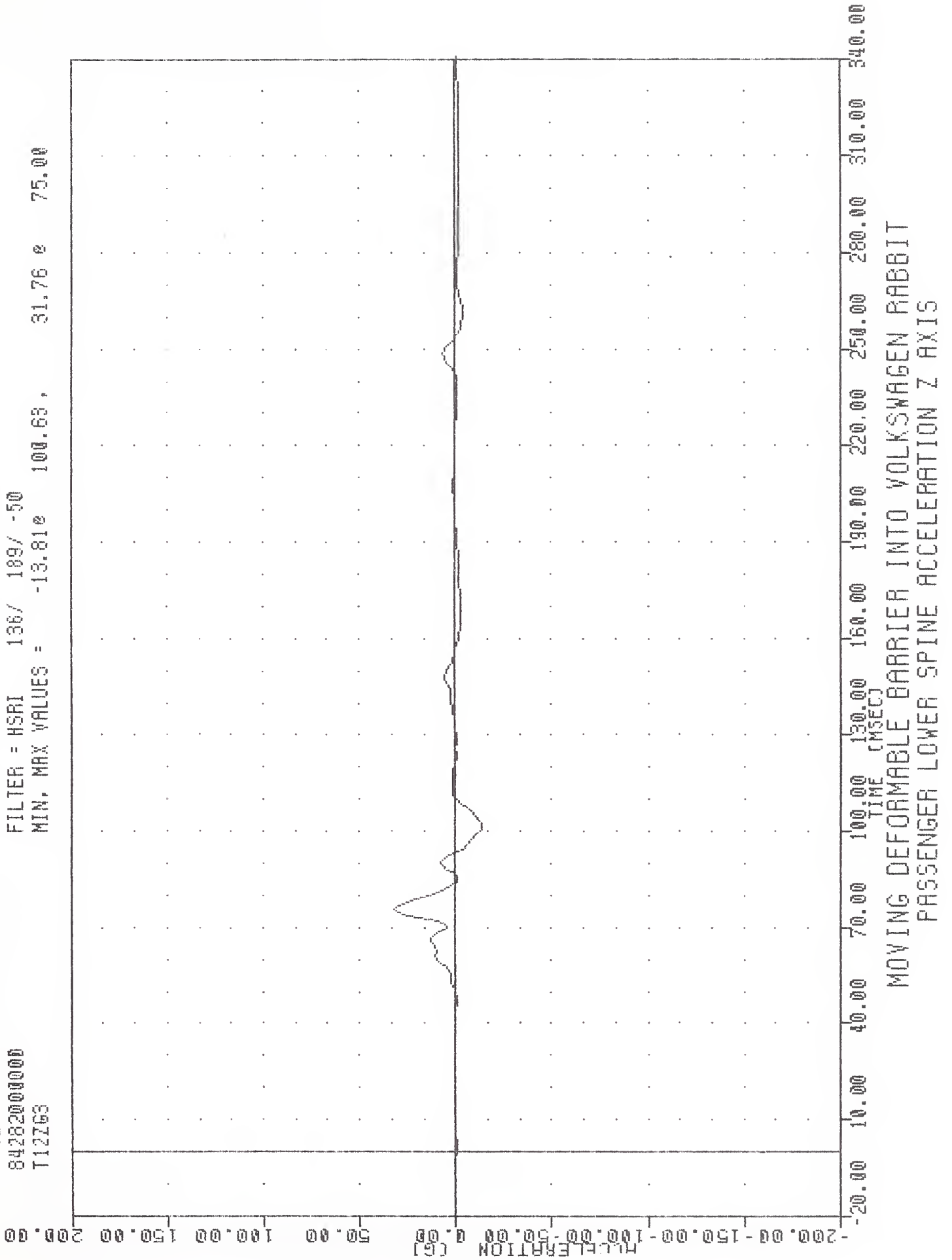


TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T12263

PLOT DATE 17-OCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -13.81e 100.63, 31.76 e 75.00



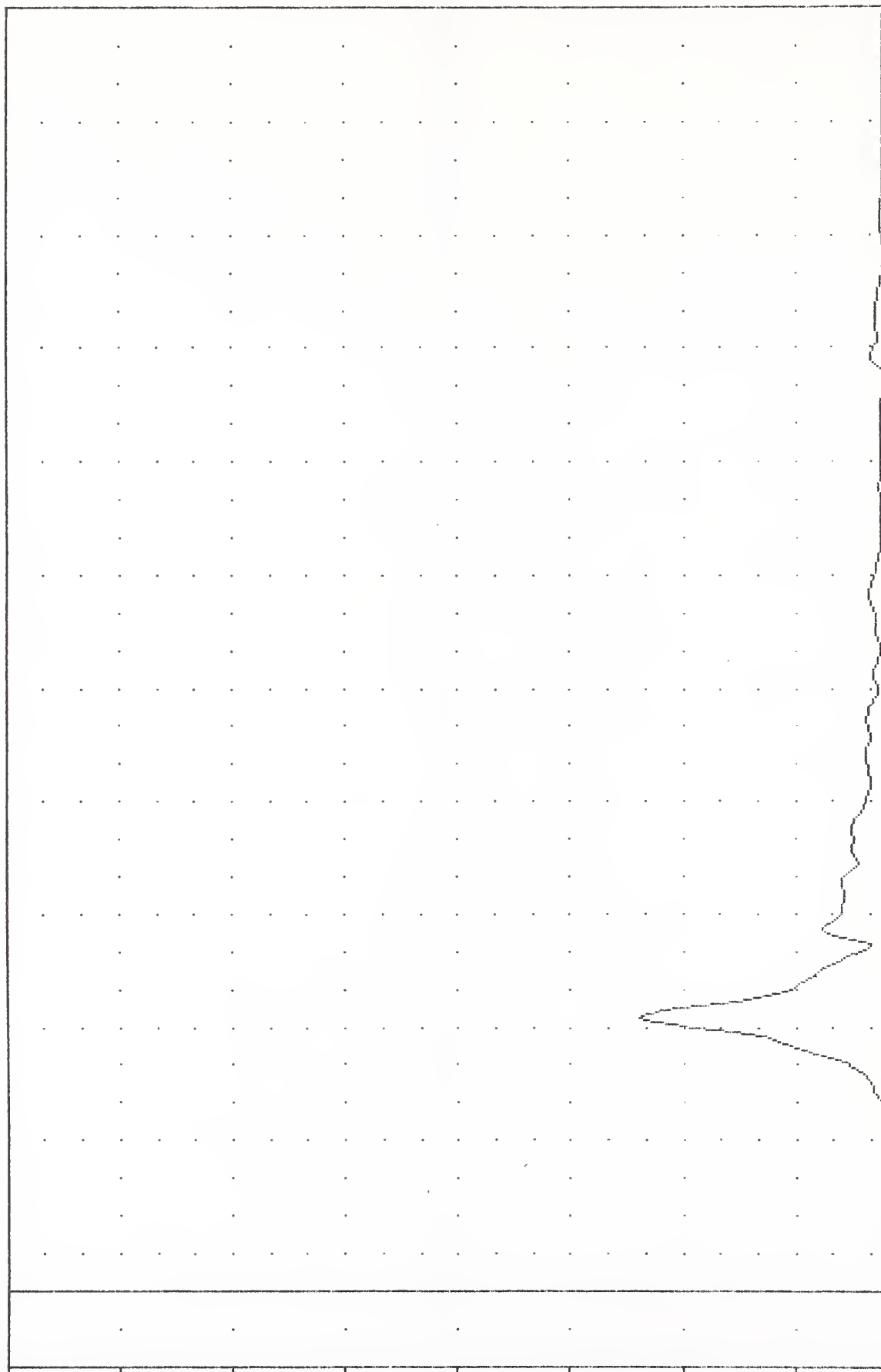
TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 T12RG3

PLUI DATE 17-UCT-84 10:13:35

FILTER = HSR 136/ 189/ -50

MIN. MAX VALUES = 0.12e 11.25, 109.62 e 71.88

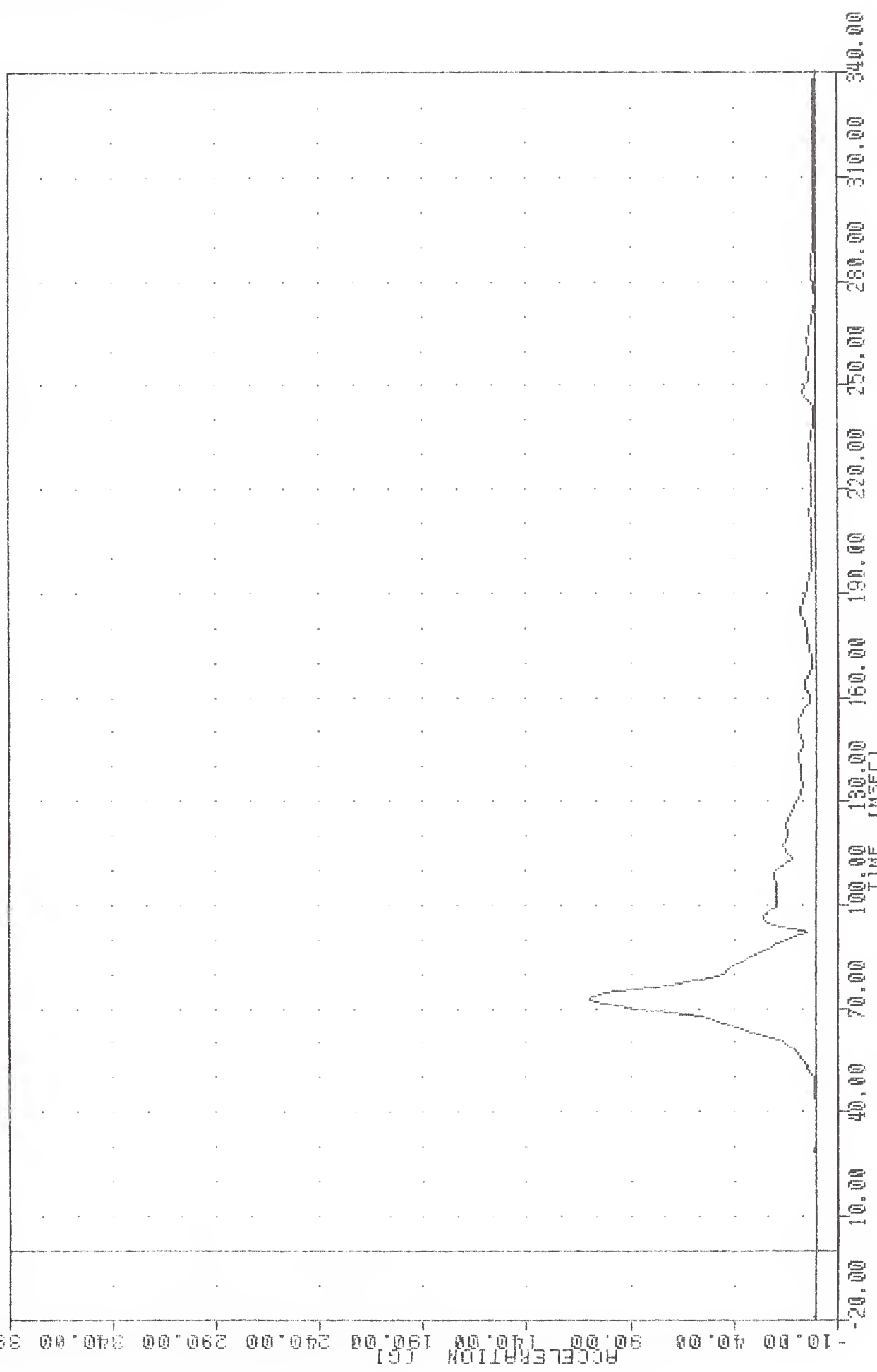
ACCELERATION (G)



-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LOWER SPINE RESULTANT

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 T1286C
 FILTER = HSAI 136/ 189/ -50
 MIN, MAX VALUES = 0.128 11.25, 110.13 71.88



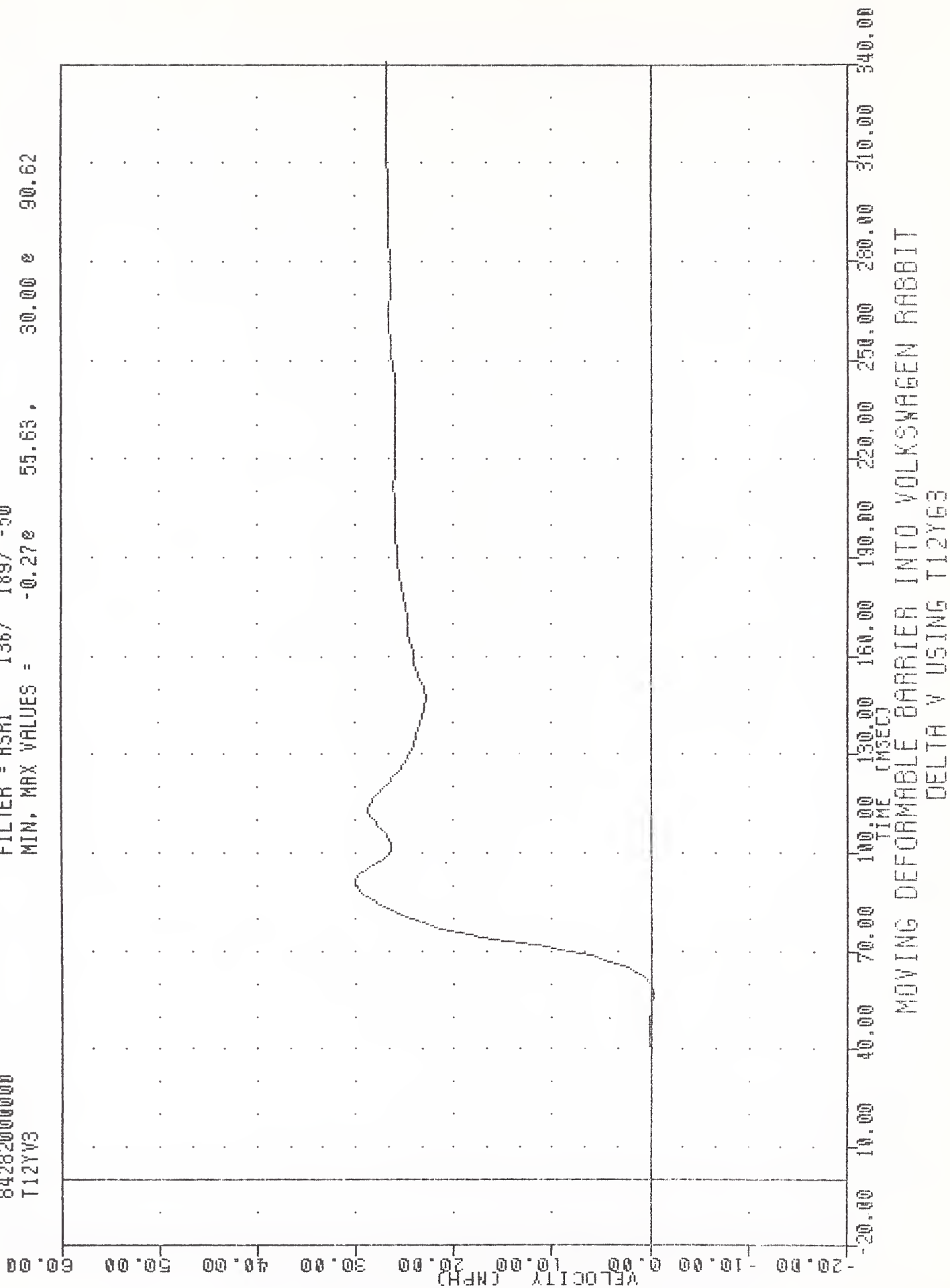
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LOWER SPINE RESULTANT USING T12YGC

THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
T12YV3

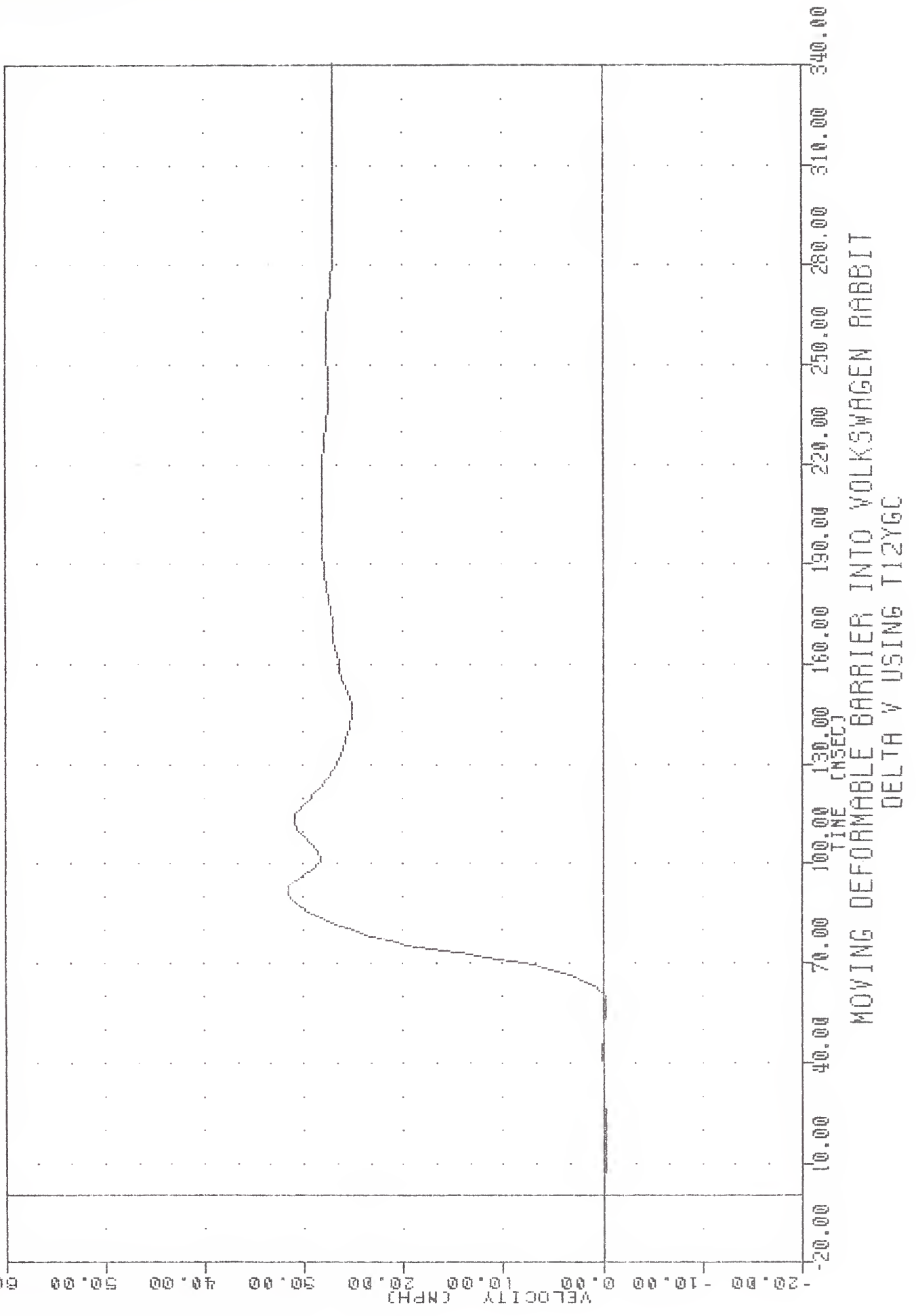
PLU1 DATE 1/-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.27e 55.63, 30.00 e 90.62



TAC , 841000
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 T12YVC
 FLU1 DATE 17-OCT-84 10:15:20
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.390 56.67, 31.58 e 91.25



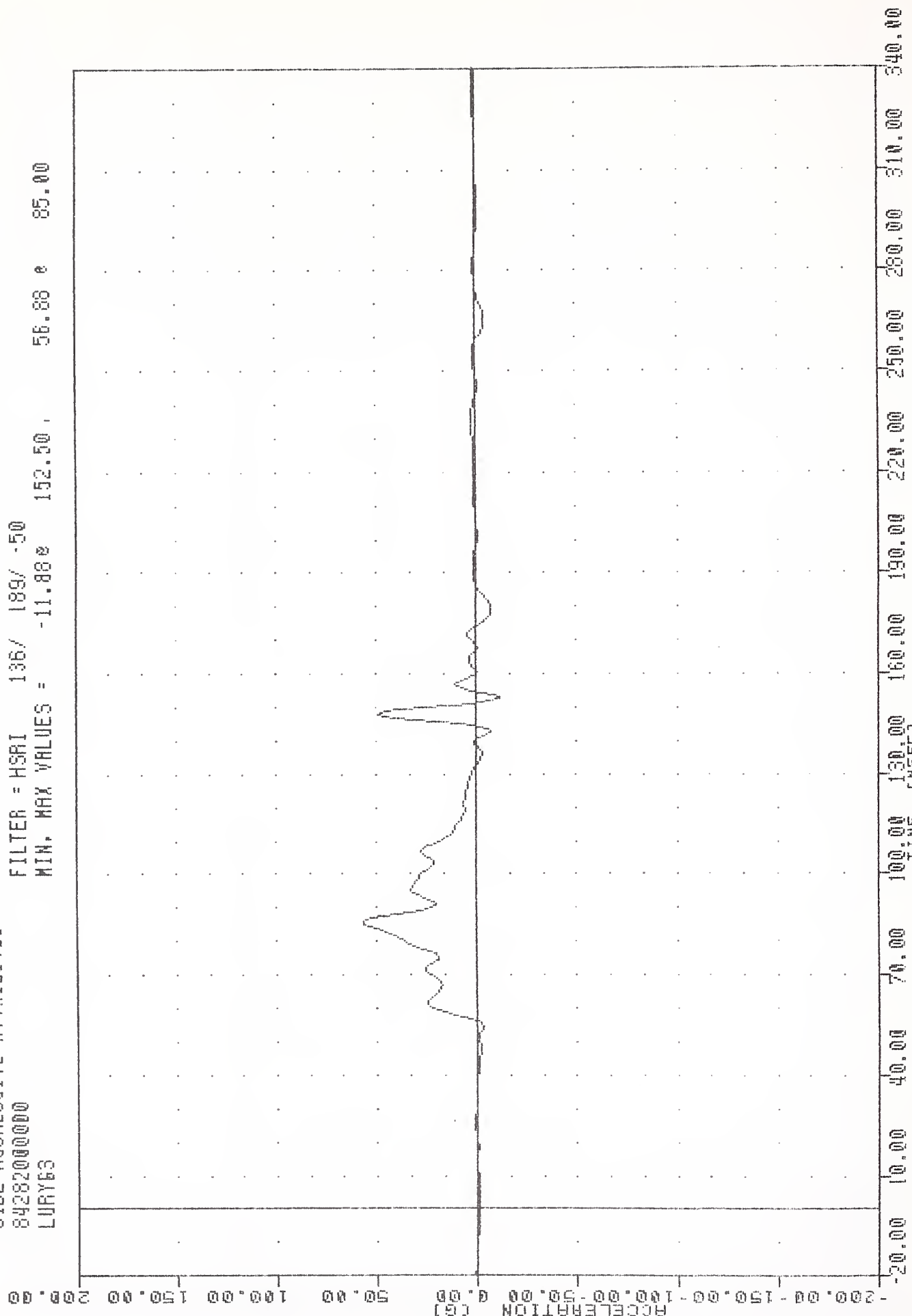
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA W USING T12YGC

TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LURY63

PLUT DATE 17-OCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -11.88 152.50 , 56.88 e 85.00



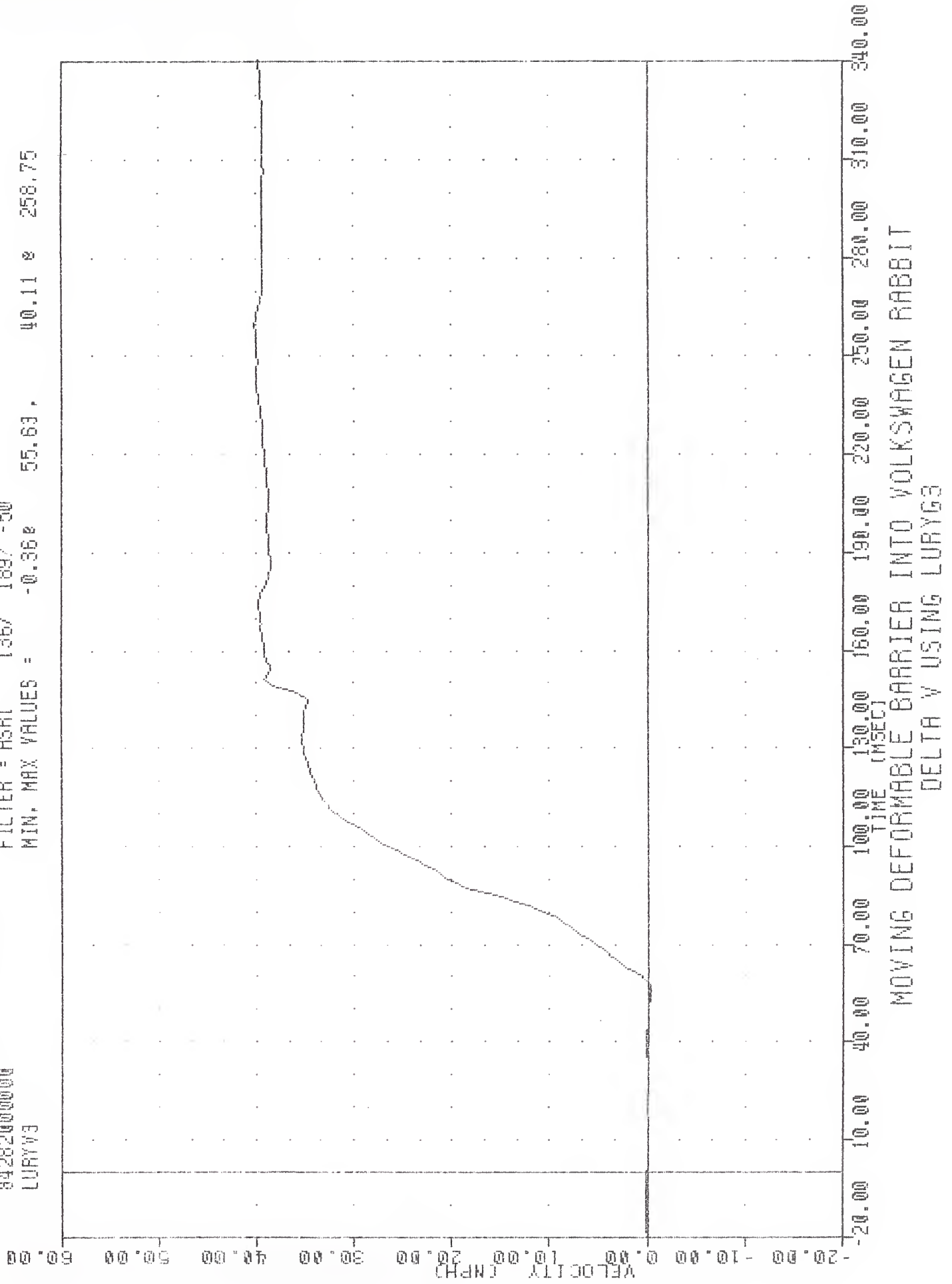
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
LURYV3

PLOT DATE 17-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.36e 55.63, 40.11 e 258.75

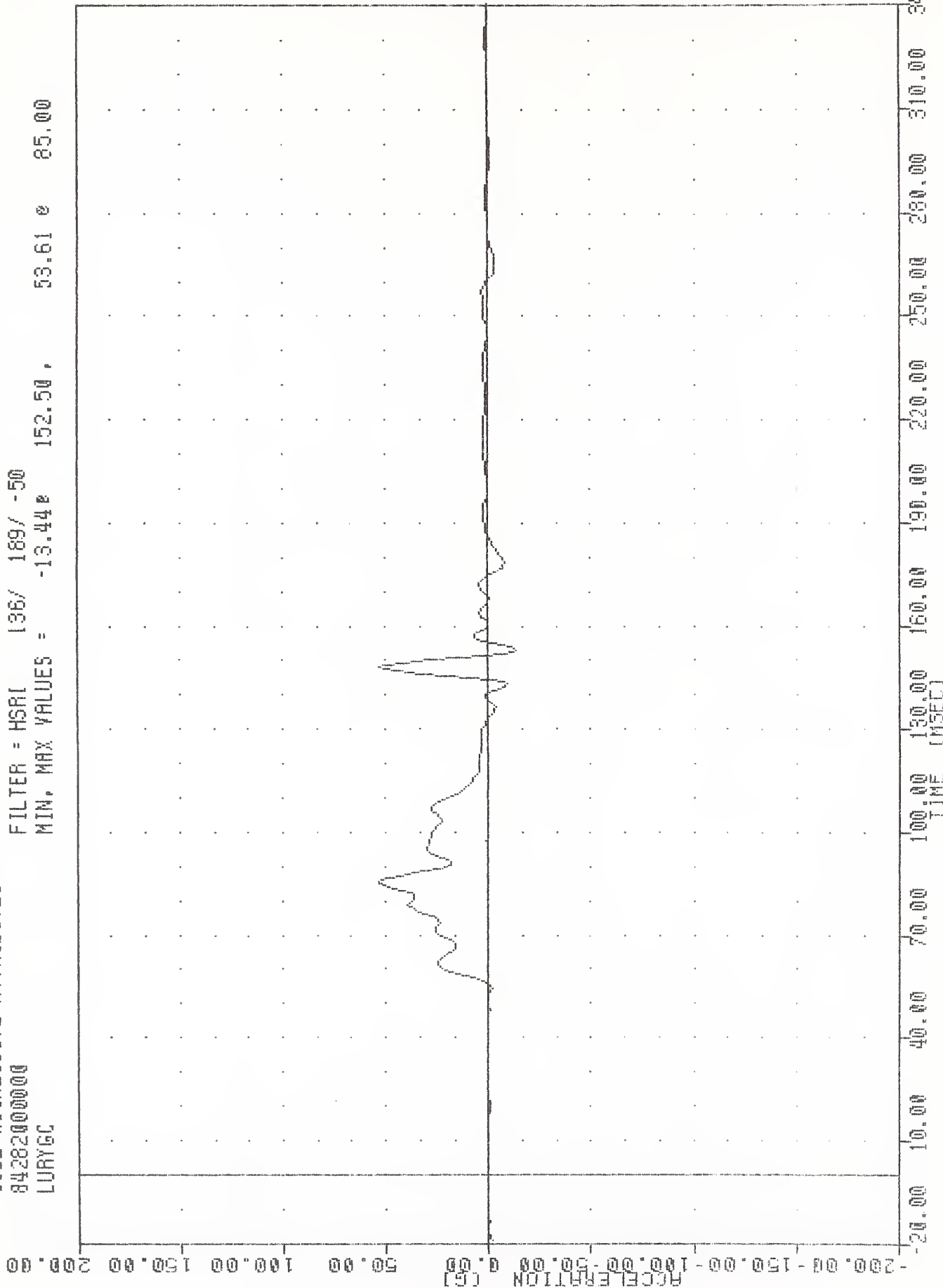


TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LURYEC

PLOT DATE 17-OCT-84 10:13:38

FILTER = HSAI 136/ 189/ -50

MIN. MAX VALUES = -13.44e 152.50 , 53.61 e 85.00



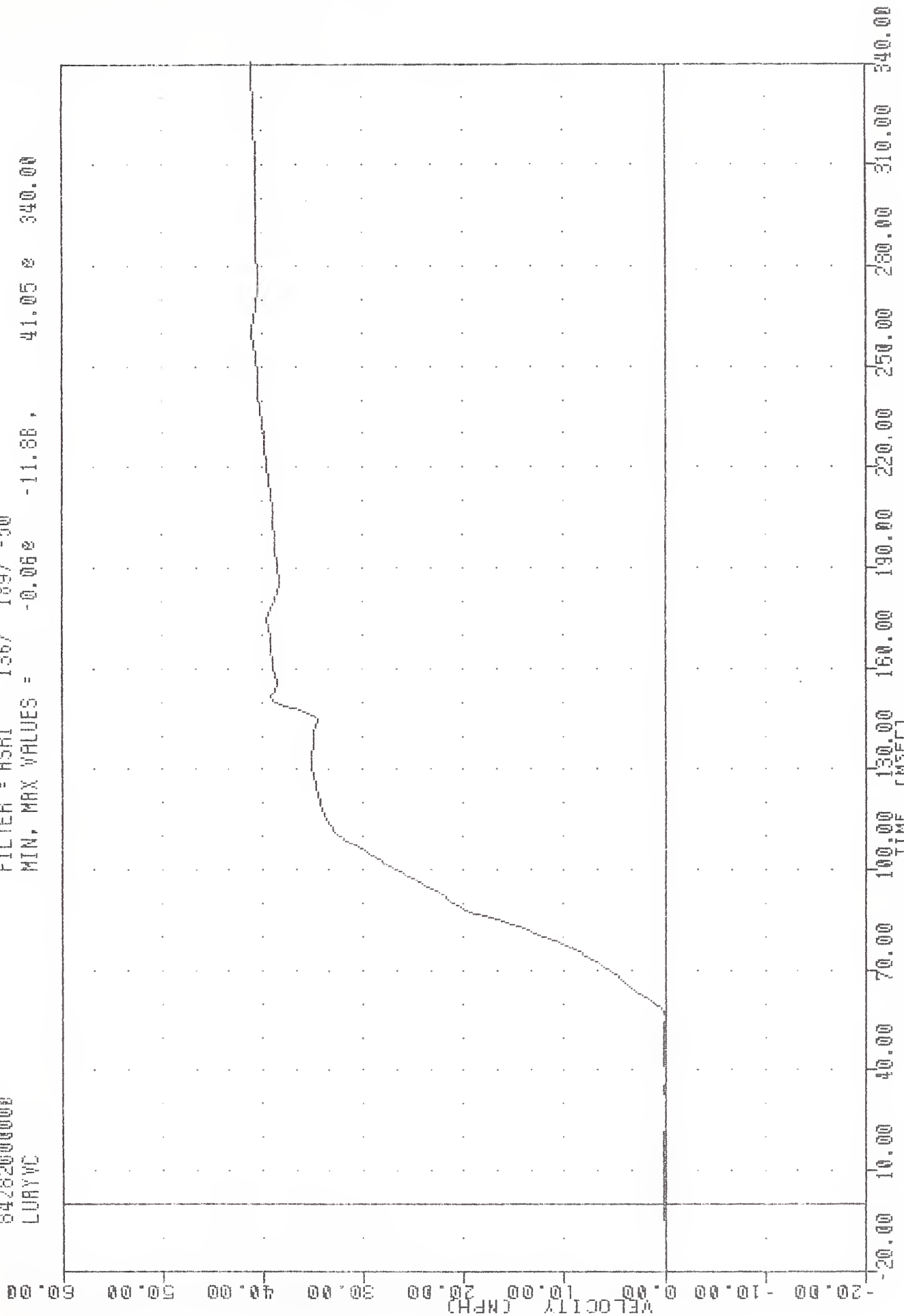
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION -Z Y AXIS

THC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LURYVC

PLU1 DATE 17-OCT-84 10:15:20

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.05e -11.88, 41.05 e 340.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LURY6C

TRC 841008 17-OCT-84 10:13:38

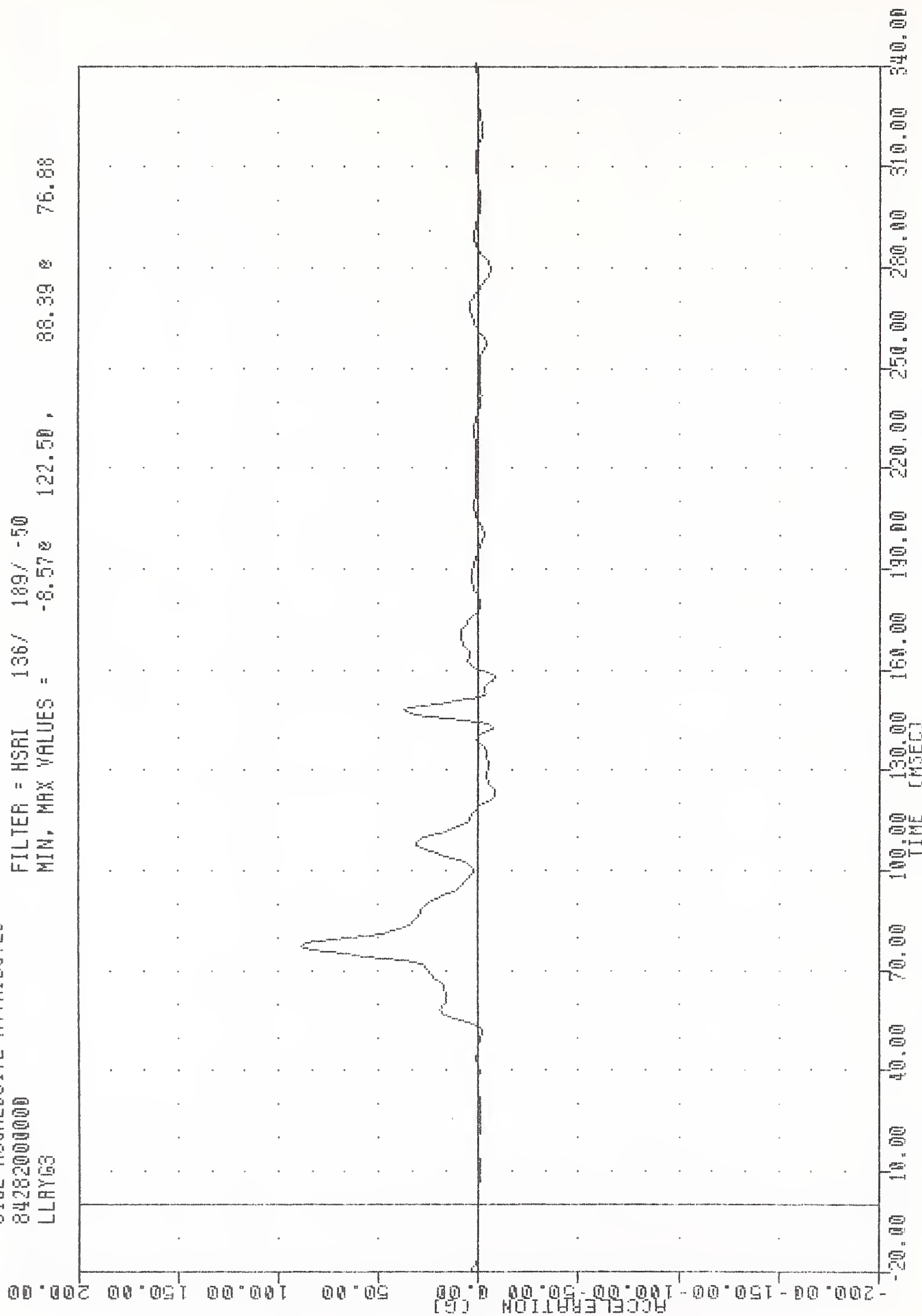
SIDE AGGRESSIVE ATTRIBUTES

84282000000

LLAY63

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -8.57e 122.50, 88.39 e 76.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS

TAC , 841003

PLOT DATE 17-OCT-84 10:15:20

SIDE AGGRESSIVE ATTRIBUTES

FILTER = HSRI 136/ 189/ -50

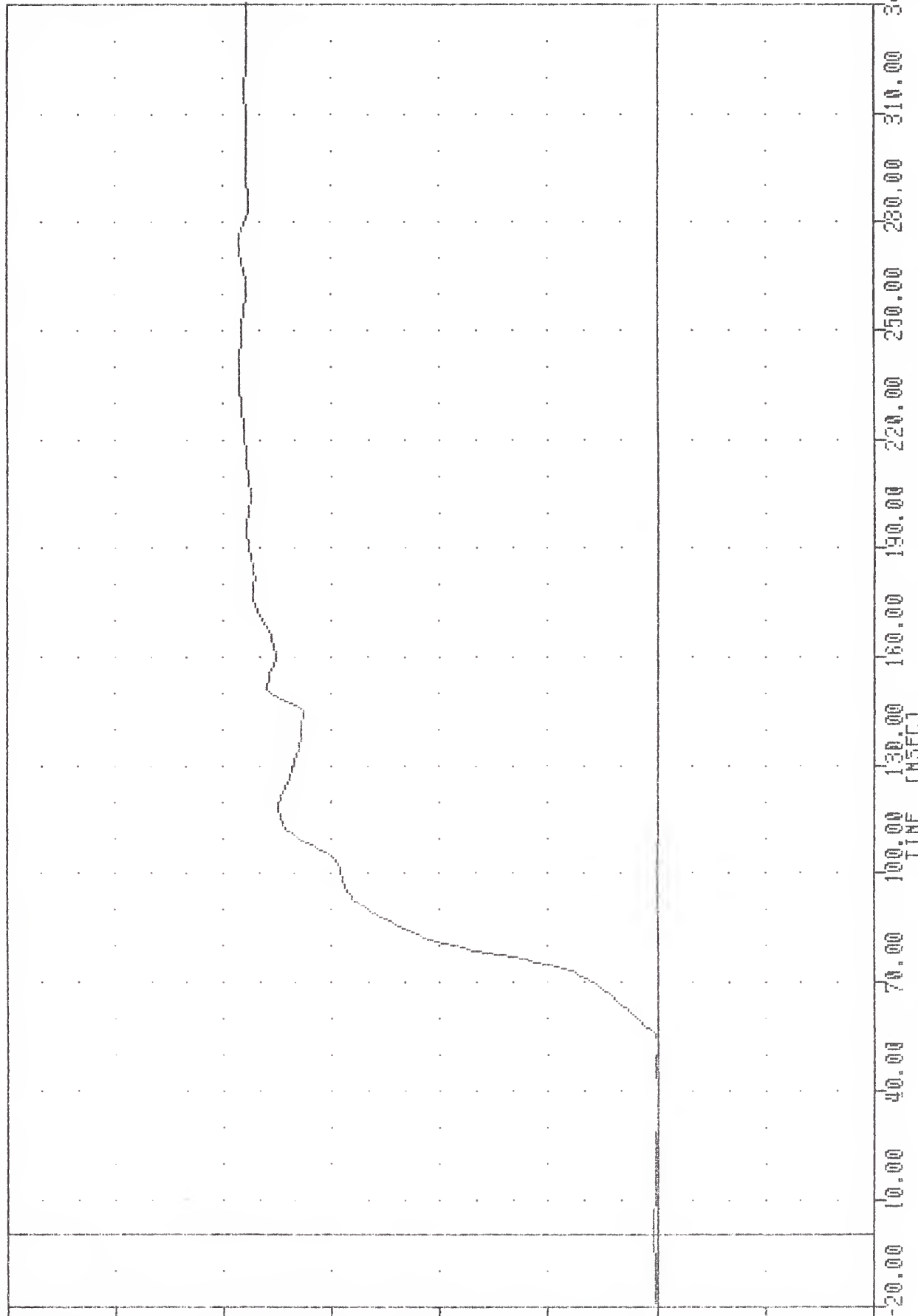
842820000000

MIN. MAX VALUES = -0.08 52.50 38.56 273.13

LLRYV3

VELOCITY (MPH)

B-61



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG3

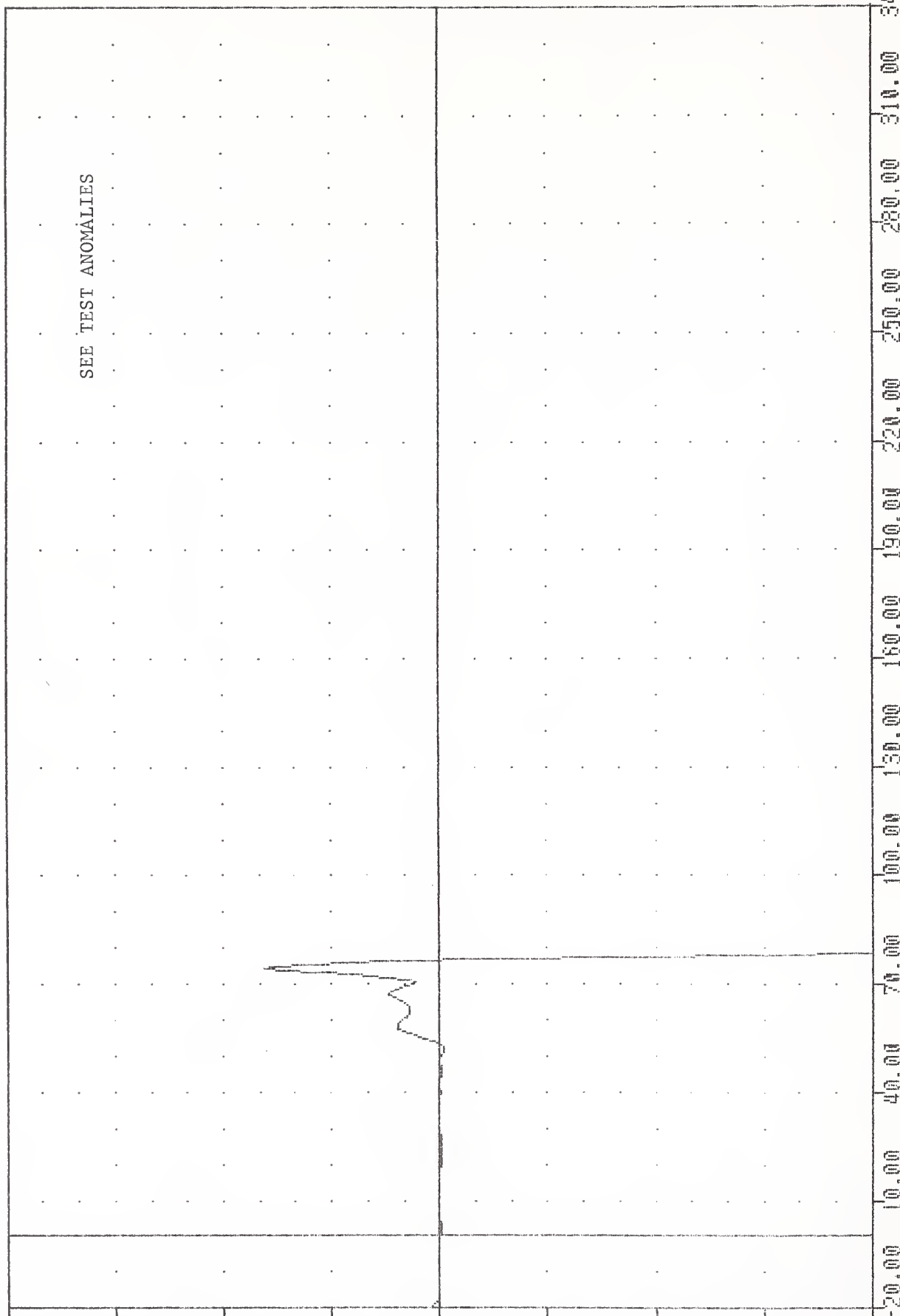
THC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LLYSEC

PLU1 DATE 17-UCT-84 10:13:38

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -308.26 80.63 , 81.08 73.75

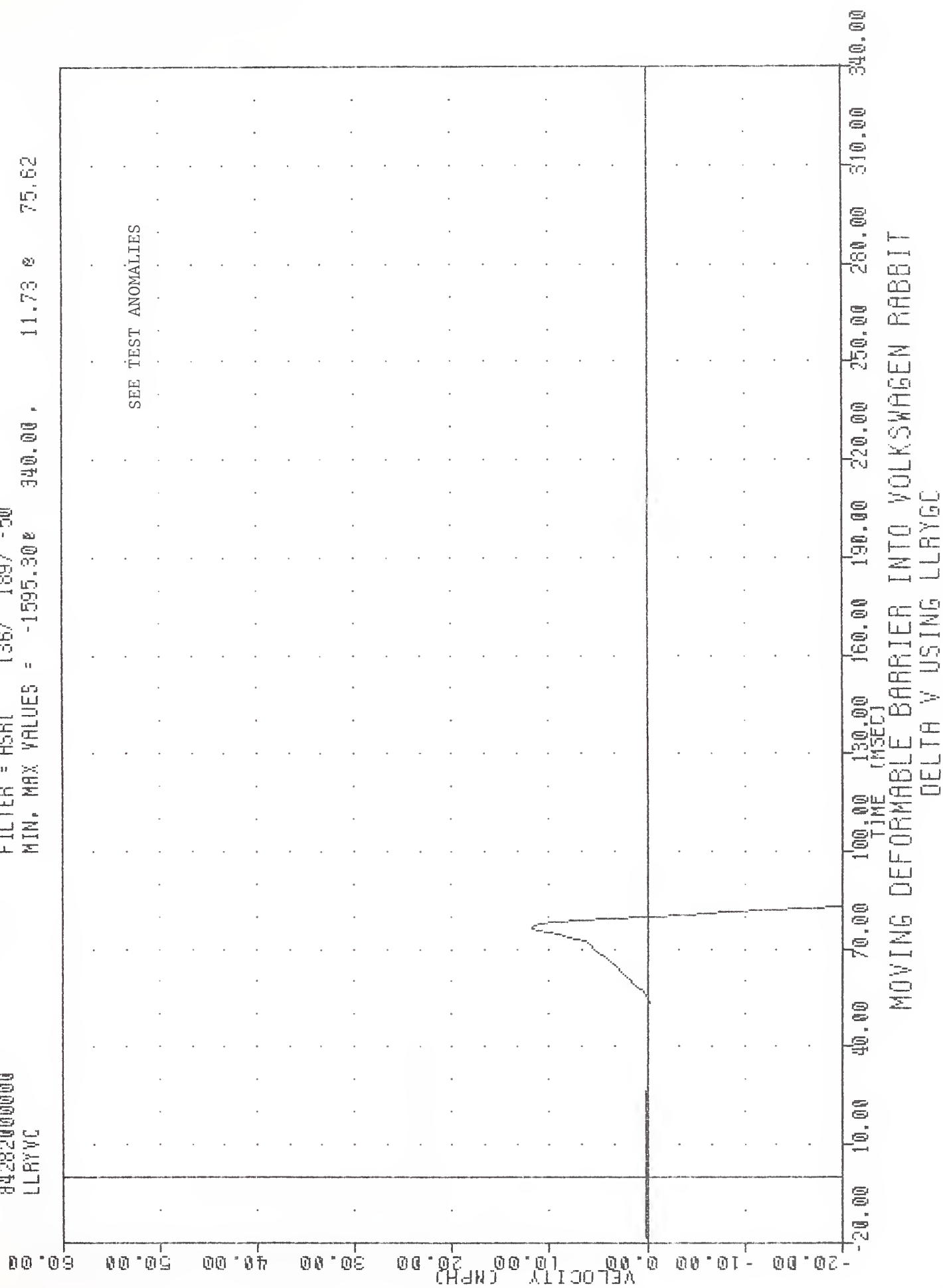
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LEFT LOWER RIB ACCELERATION -2 Y AXIS

100

SEE TEST ANOMALIES

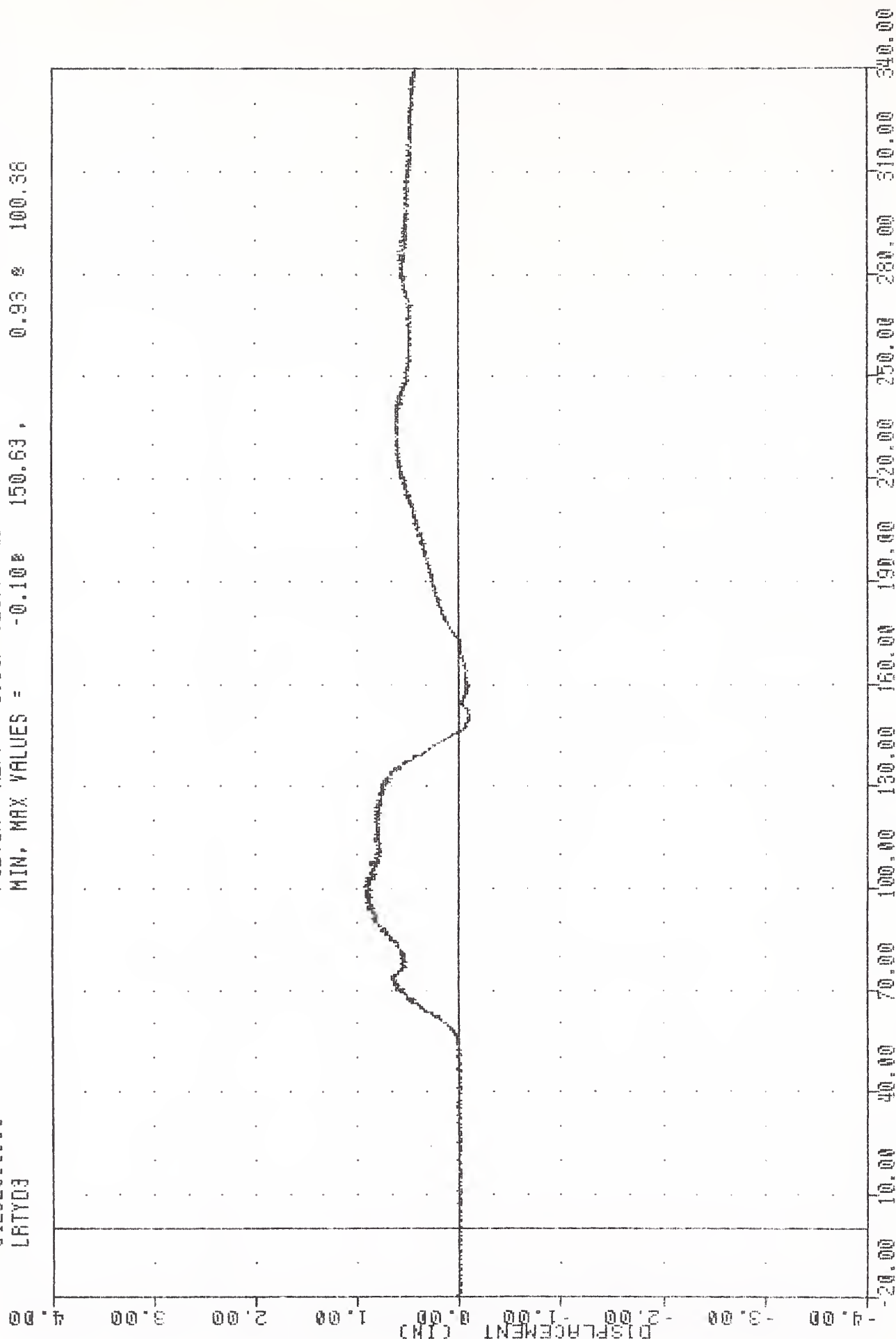


TRC ,841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
LRTYD3

PLOT DATE 17-OCT-84 10:16:30

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -0.10e 150.63, 0.93 e 100.36



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES

TRC ,841008 PLOT DATE 17-OCT-84 10:16:30

SIDE AGGRESSIVE ATTRIBUTES

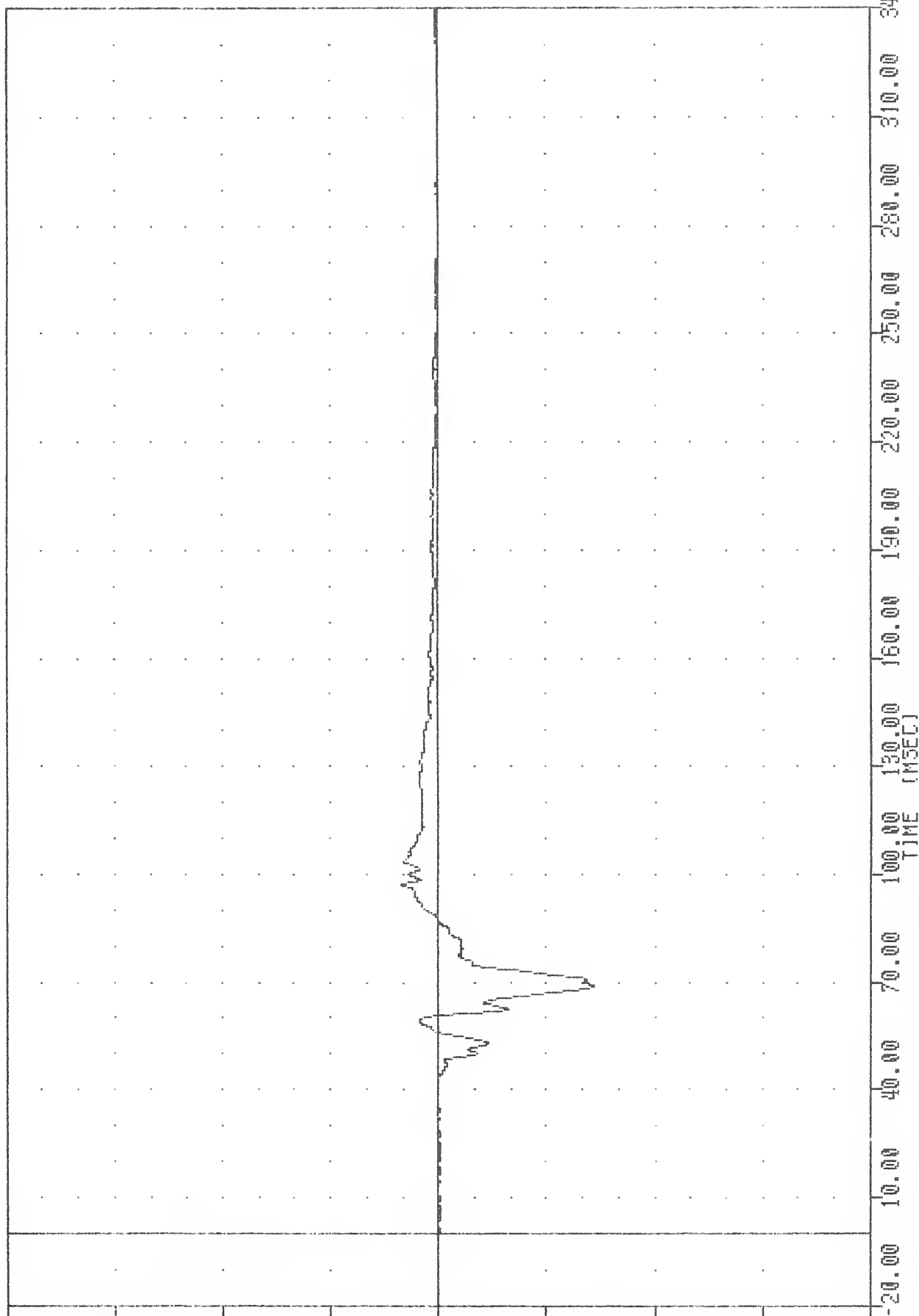
842820000000

FILTER = BLPF 300/ 949/ -40

PEVXG3

MIN, MAX VALUES = -72.18 68.75, 17.42 97.00

ACCELERATION (G)

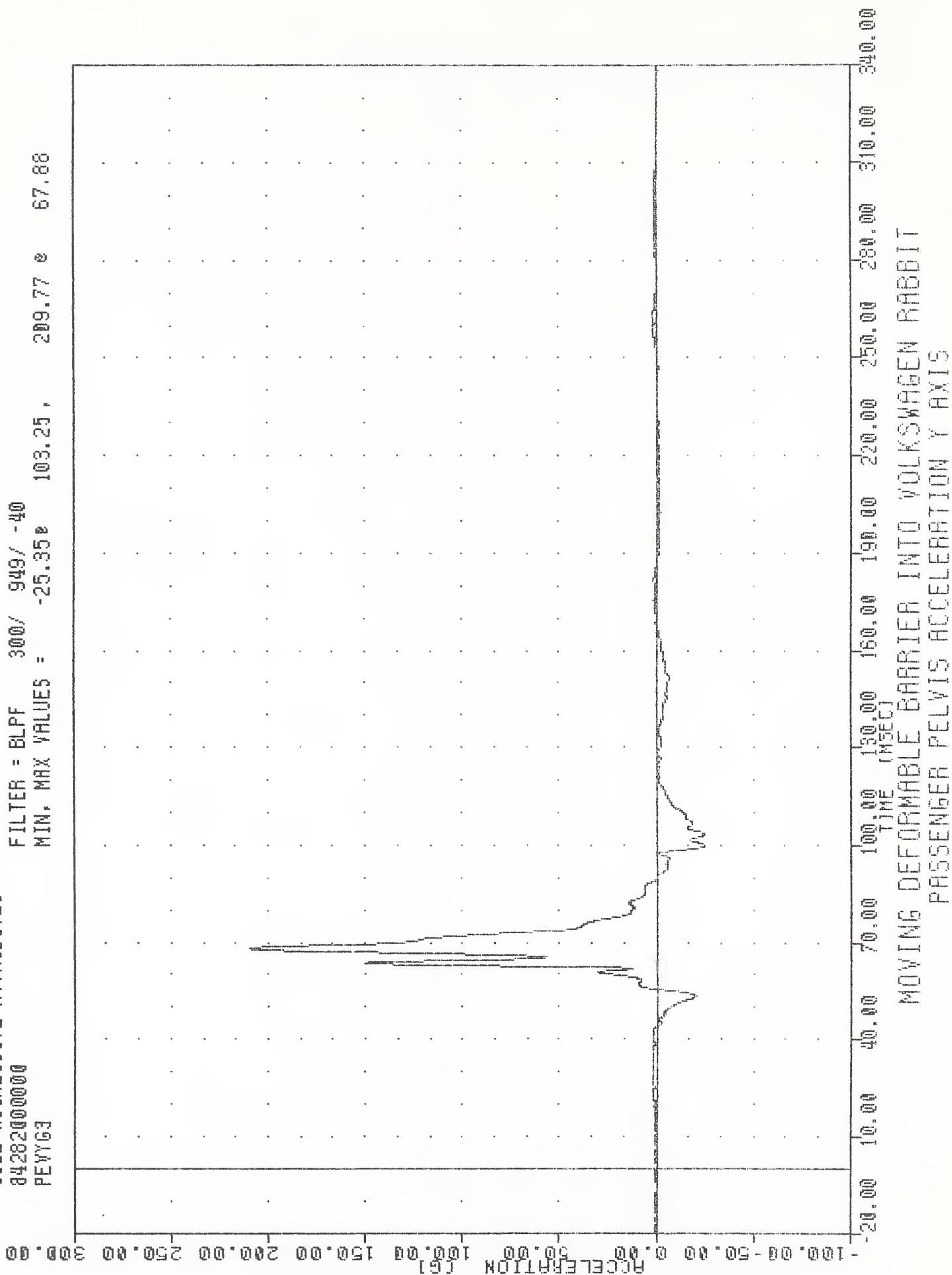


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION X AXIS

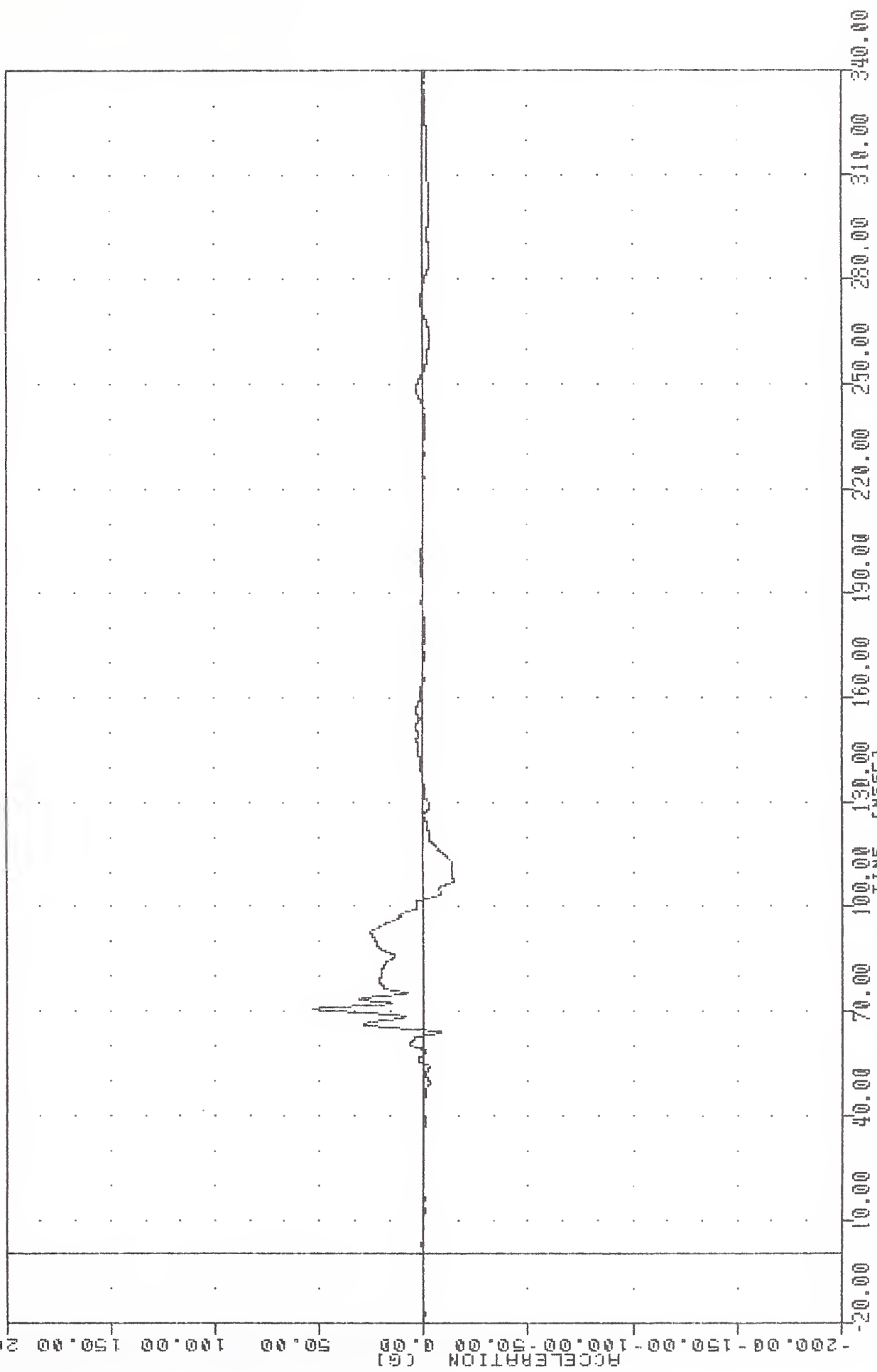
PLOT DATE 18-OCT-84 16:14:32

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
PEVY63

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -25.35e 103.25 , 209.77 e 67.86



TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 PEVZES
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -14.45e 107.63, 53.40 e 70.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER PELVIS ACCELERATION Z AXIS

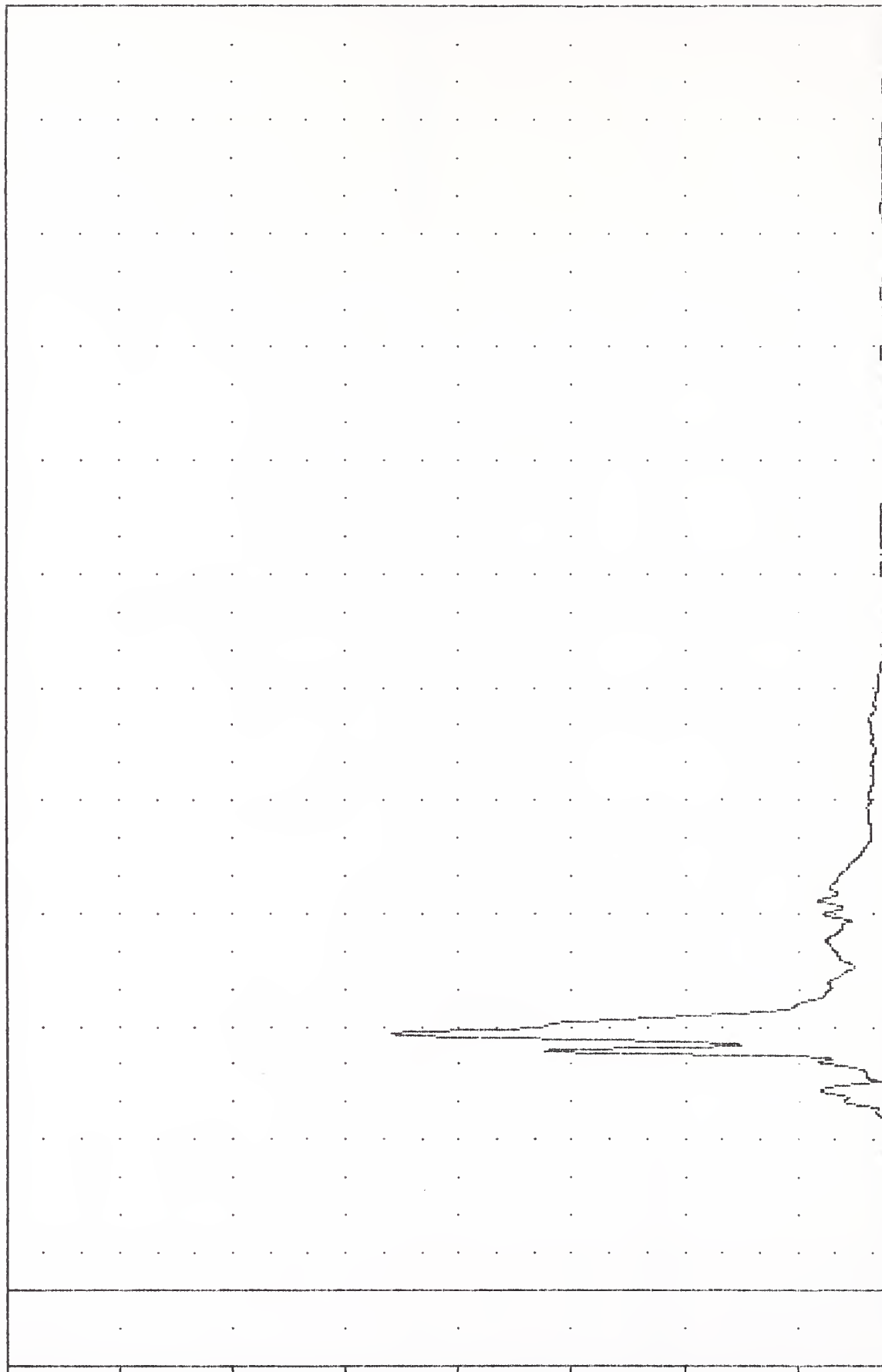
TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
PEVRG3

PLU1 DATE 17-OCT-84 10:18:22

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 0.06e 11.00, 220.41 e 68.00

ACCELERATION (G)

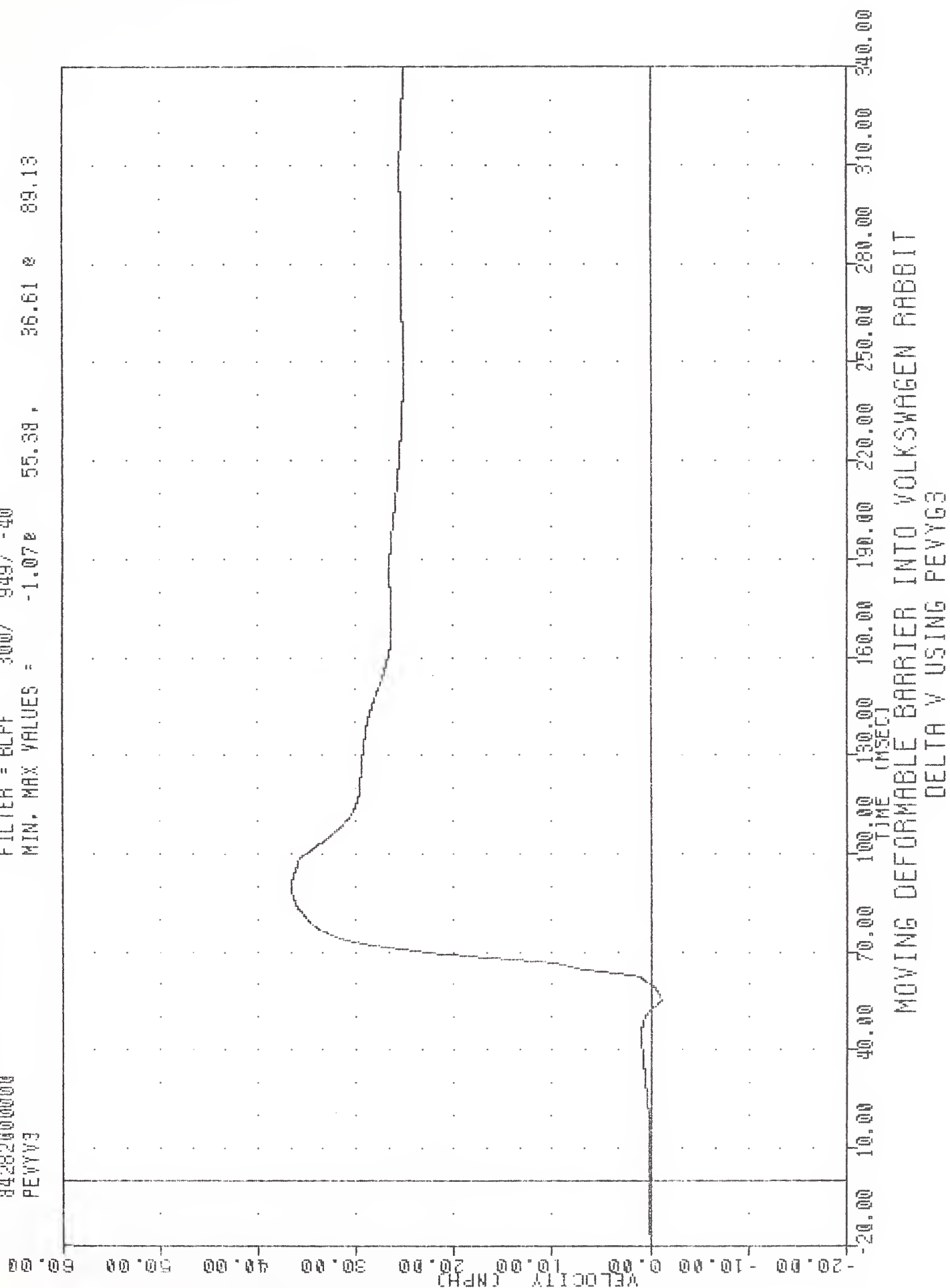


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS RESULTANT

PLU1 DATE 17-OCT-84 10:18:53

THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
PEVYV3

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -1.07e 55.38 , 36.61 e 89.13

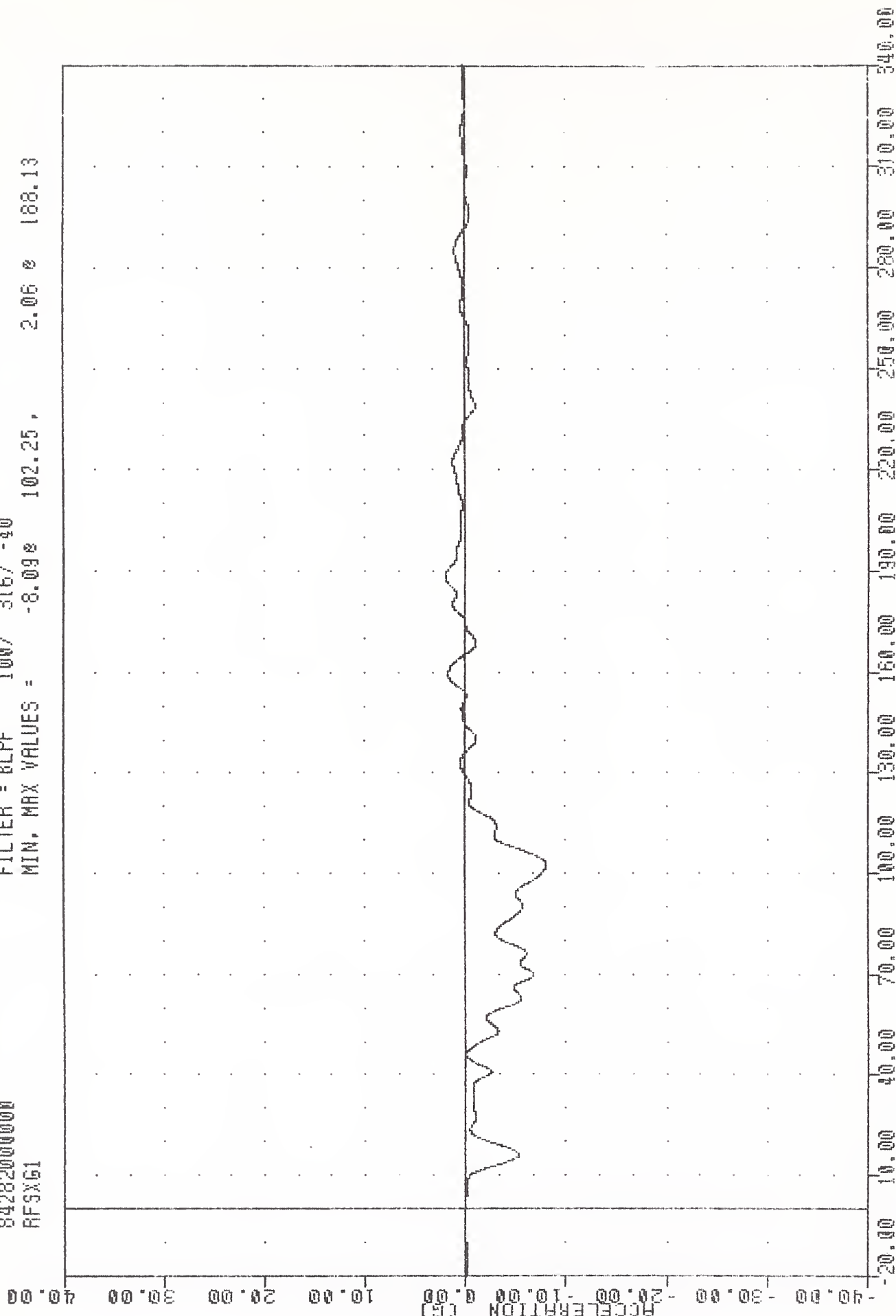


TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
RFSX61

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

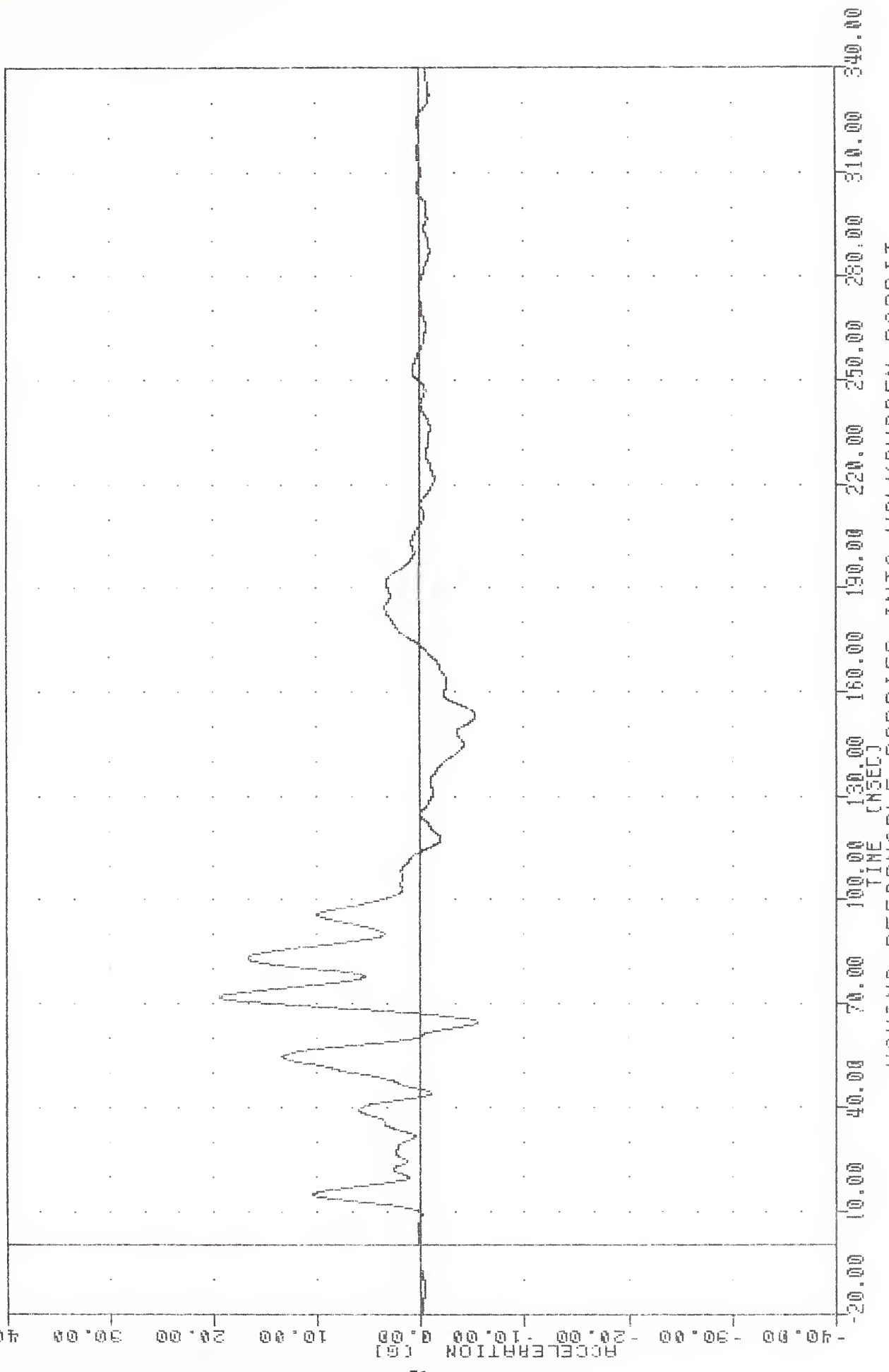
MIN. MAX VALUES = -8.098 102.25, 2.06 188.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION X AXIS

TAC , 841003
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RFSY61

PLOT DATE 17-OCT-84 10:16:30
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -5.462 64.63 19.44 e 71.75



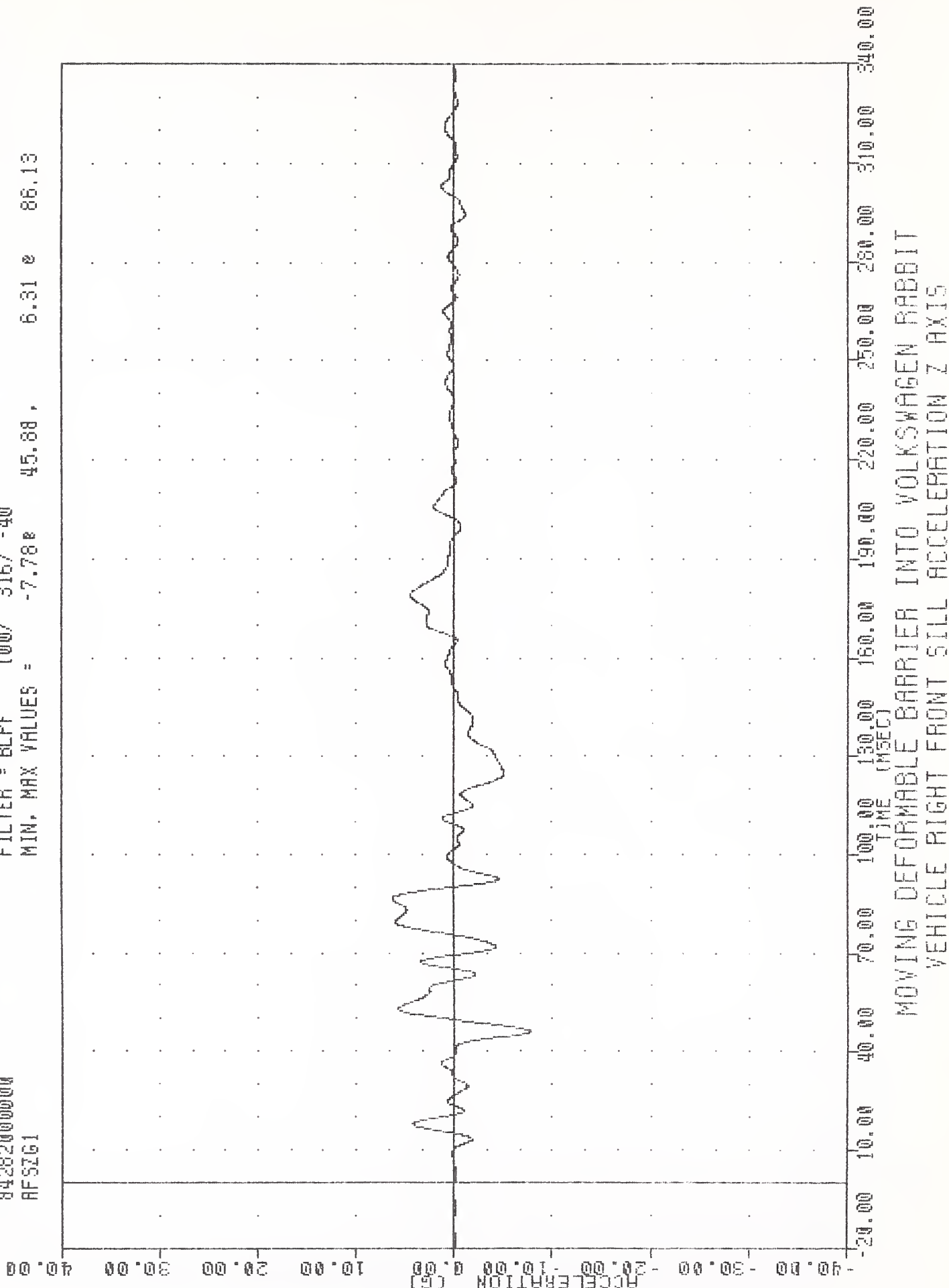
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS

TRC ,841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
AFS2G1

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -7.78e 45.88 , 6.31 e 86.13

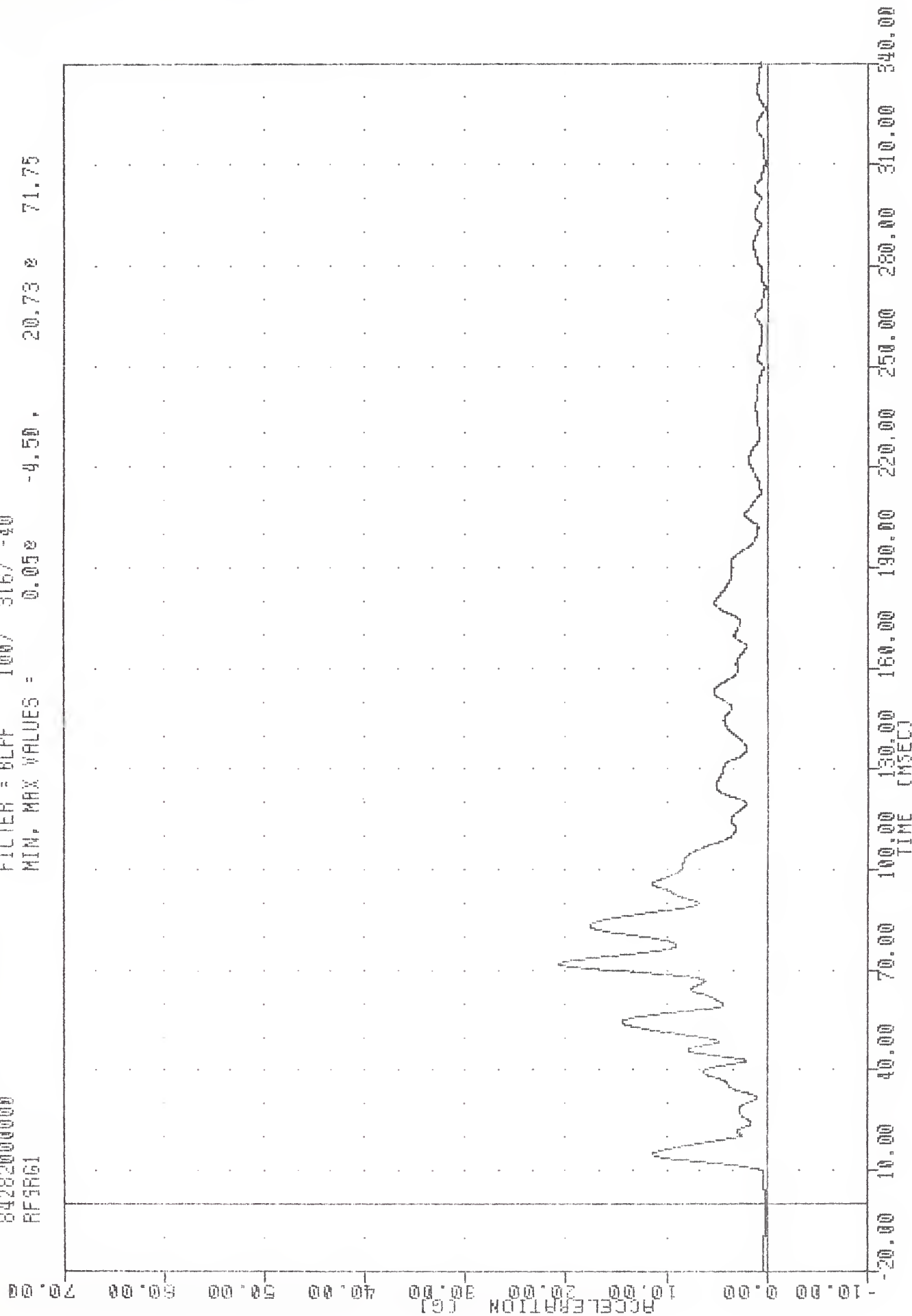


TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 RF3R61

PLOT DATE 17-OCT-84 10:18:22

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.05e -4.50, 20.73 e 71.75

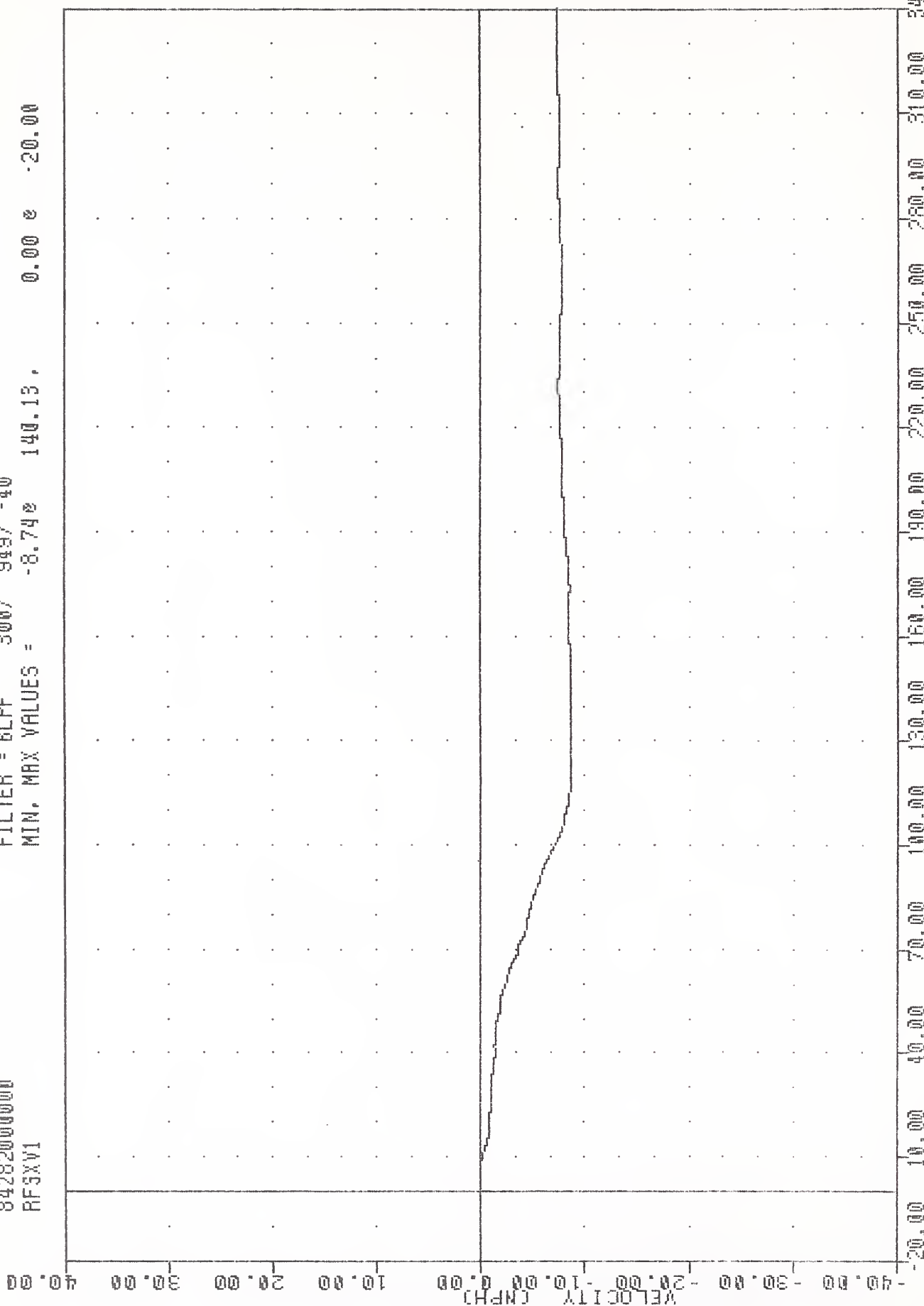


TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 RFSXV1

PLOT DATE 17-OCT-84 10:18:53

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -8.74e 140.13, 0.00 e -20.00



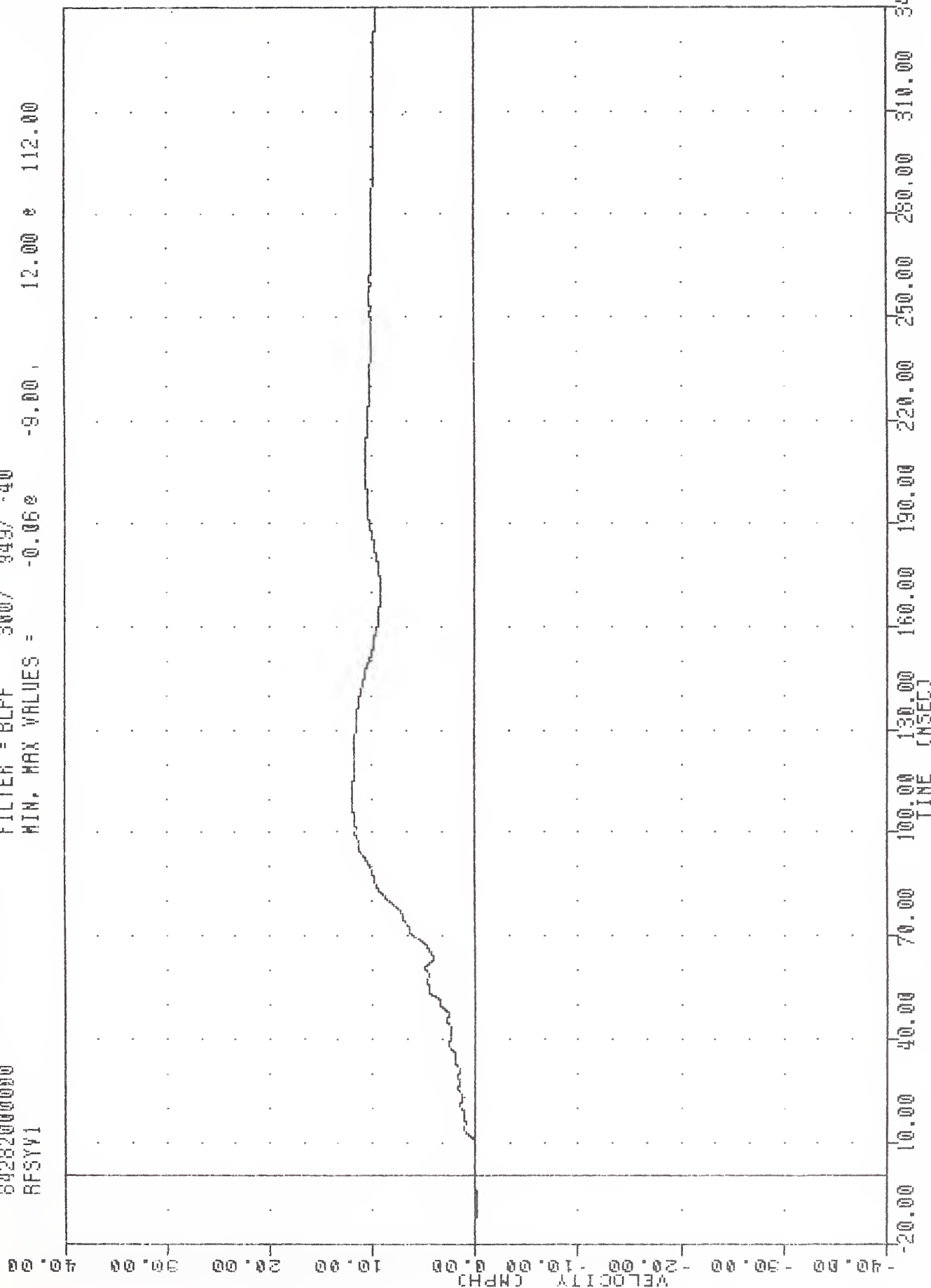
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING RFSXG1

TAC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RFSYV1

PLOT DATE 17-OCT-84 10:18:53

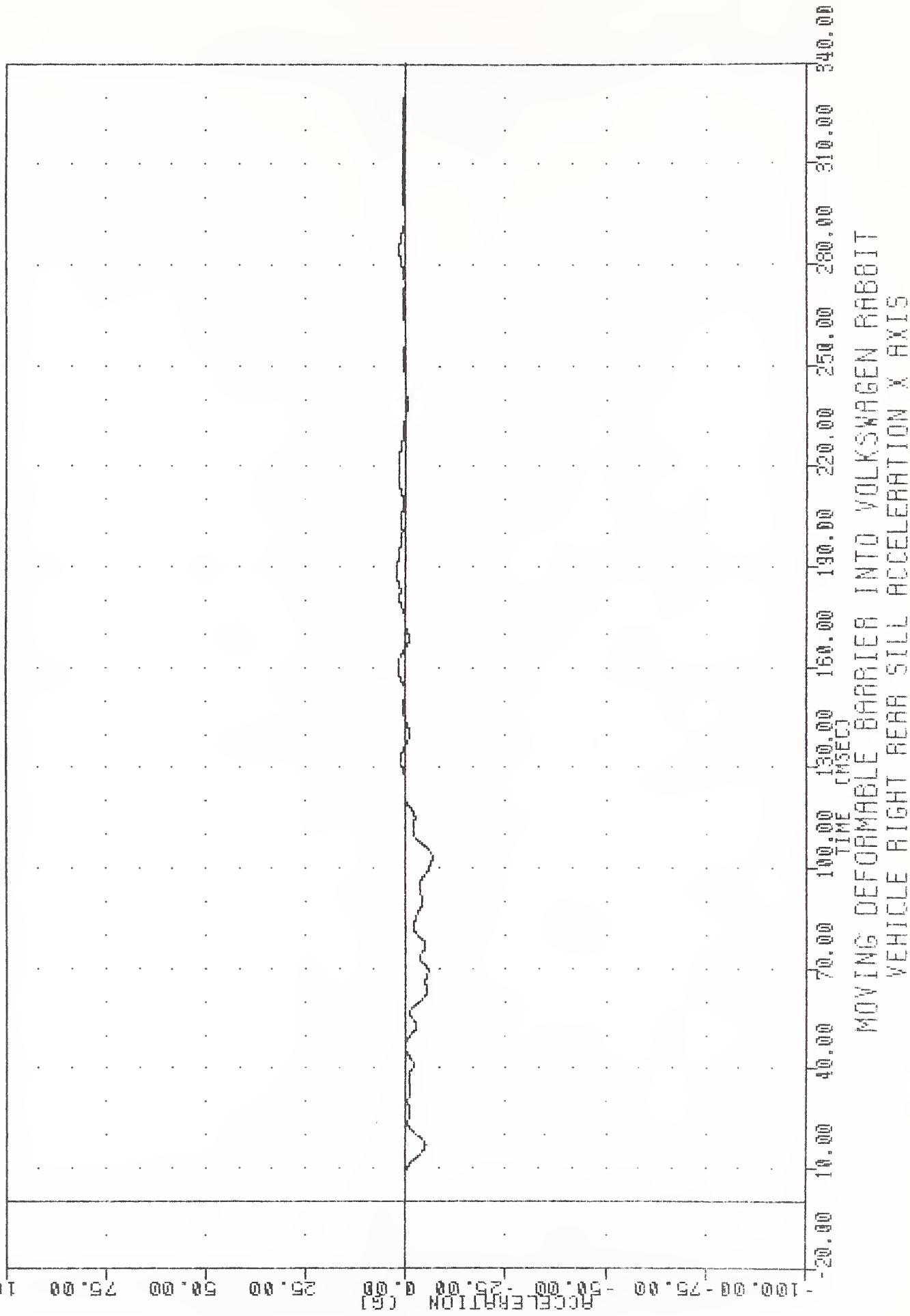
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -0.060 -9.00 , 12.00 e 112.00



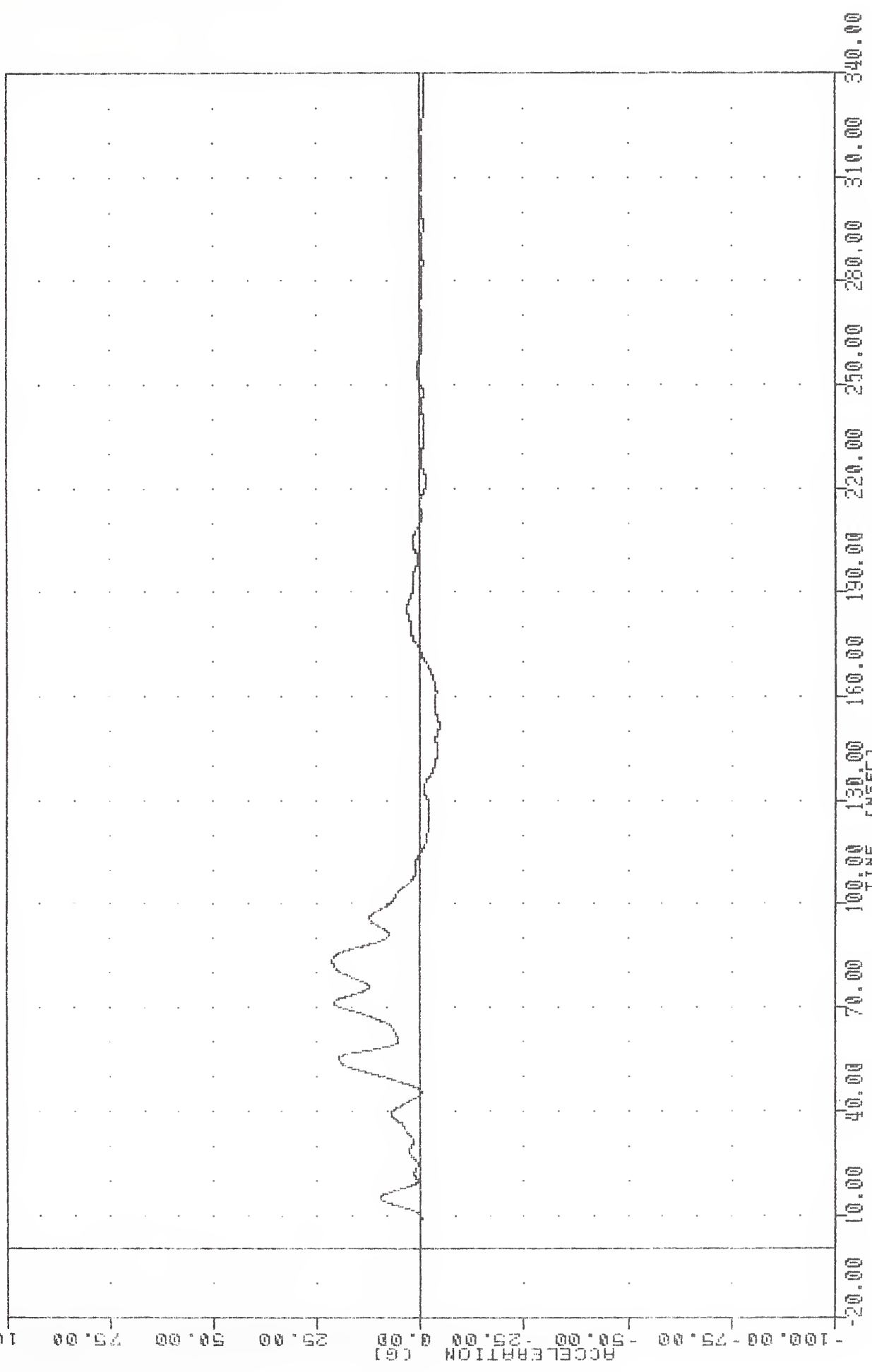
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RFSYG1

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 RRSXG2
 PLOT DATE 17-OCT-84 10:16:30
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -6.64e 103.00, 2.42 e 188.38



TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 RRSY62
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -4.46e 151.50, 21.16 e 83.25

PLOT DATE 17-OCT-84 10:16:30



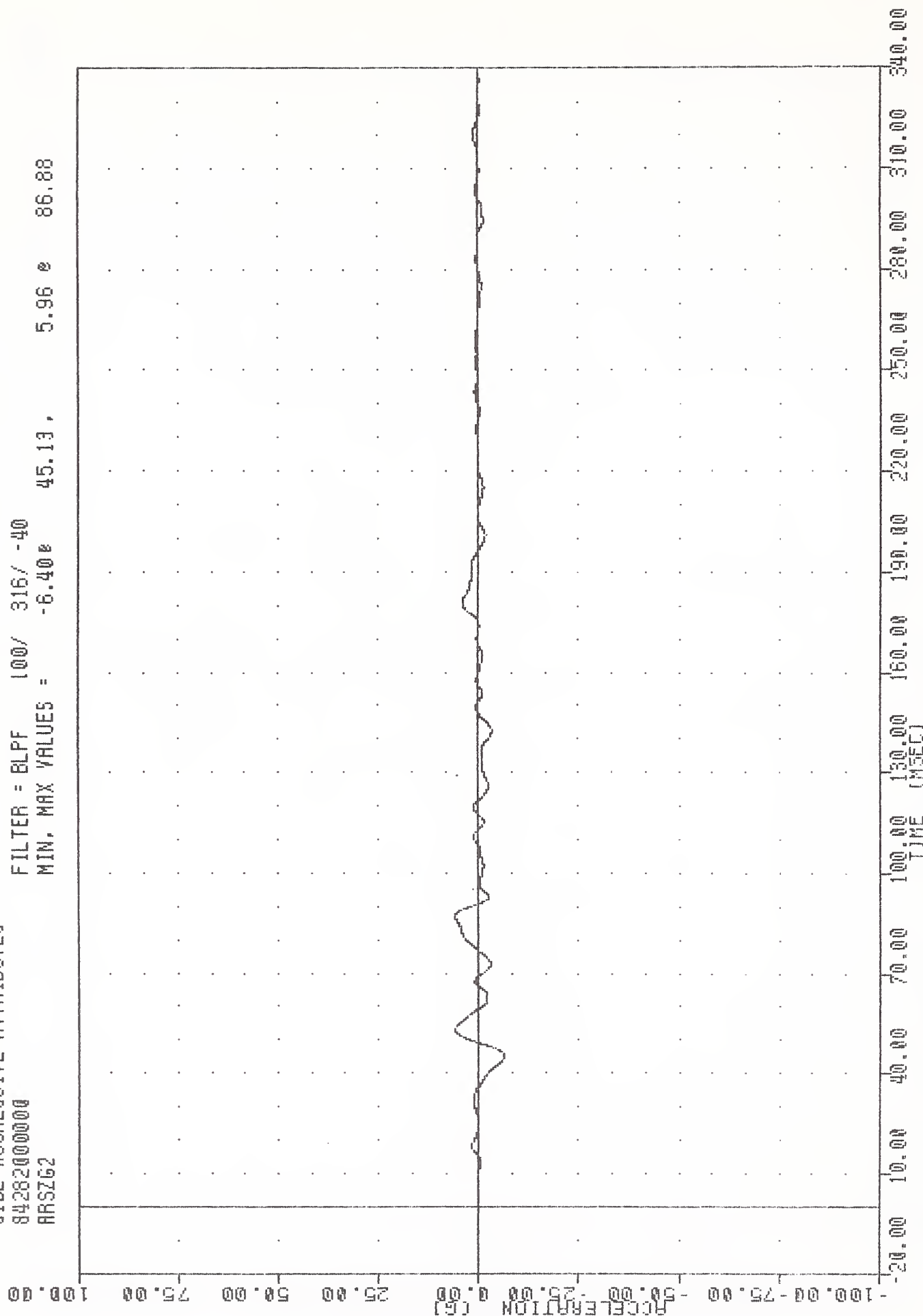
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RRSZ62

PLUT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -6.40e 45.13, 5.96 e 86.88



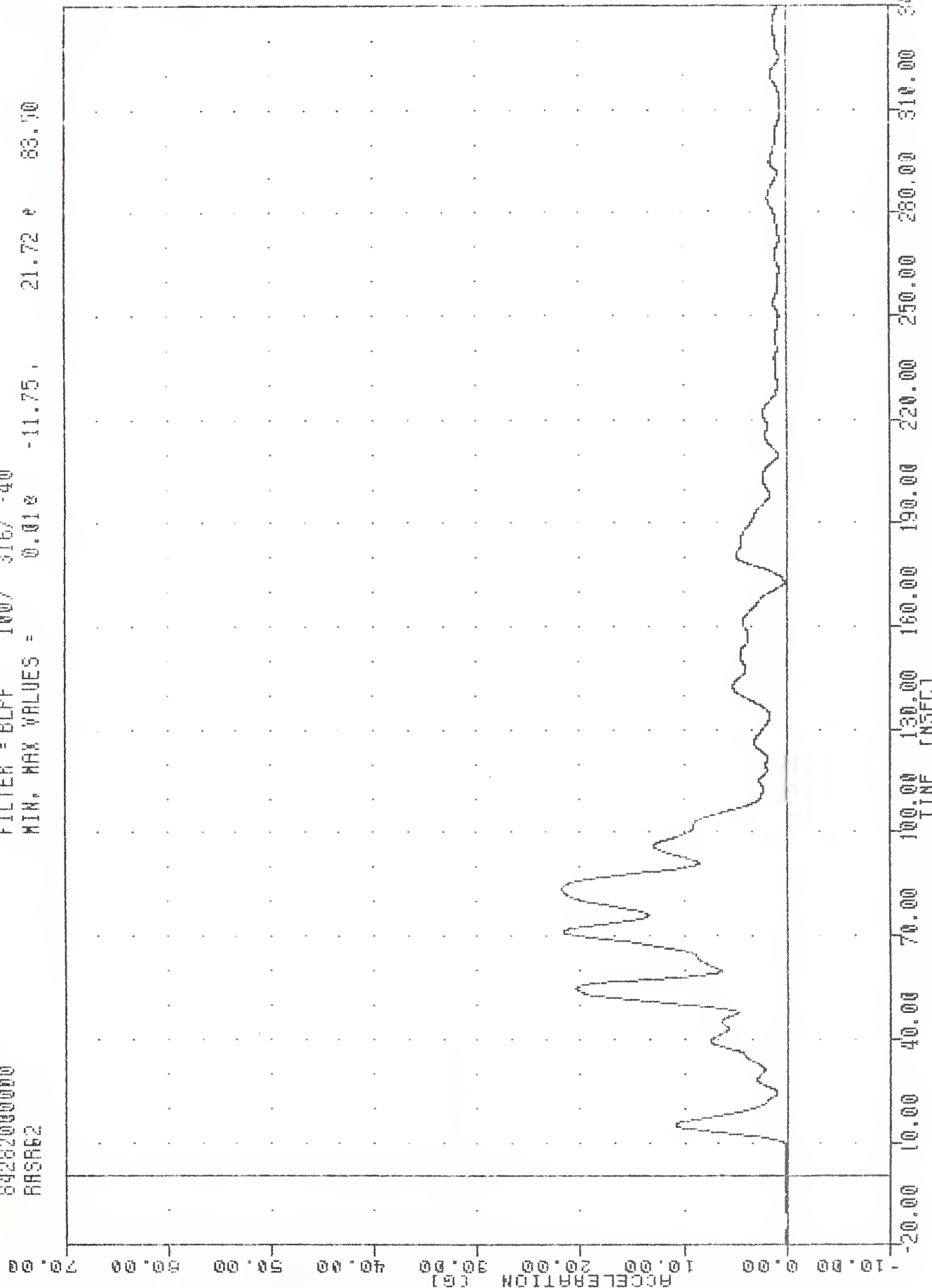
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION Z AXIS

TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 RASR62

PLUT DATE 17-UCT-84 10:18:22

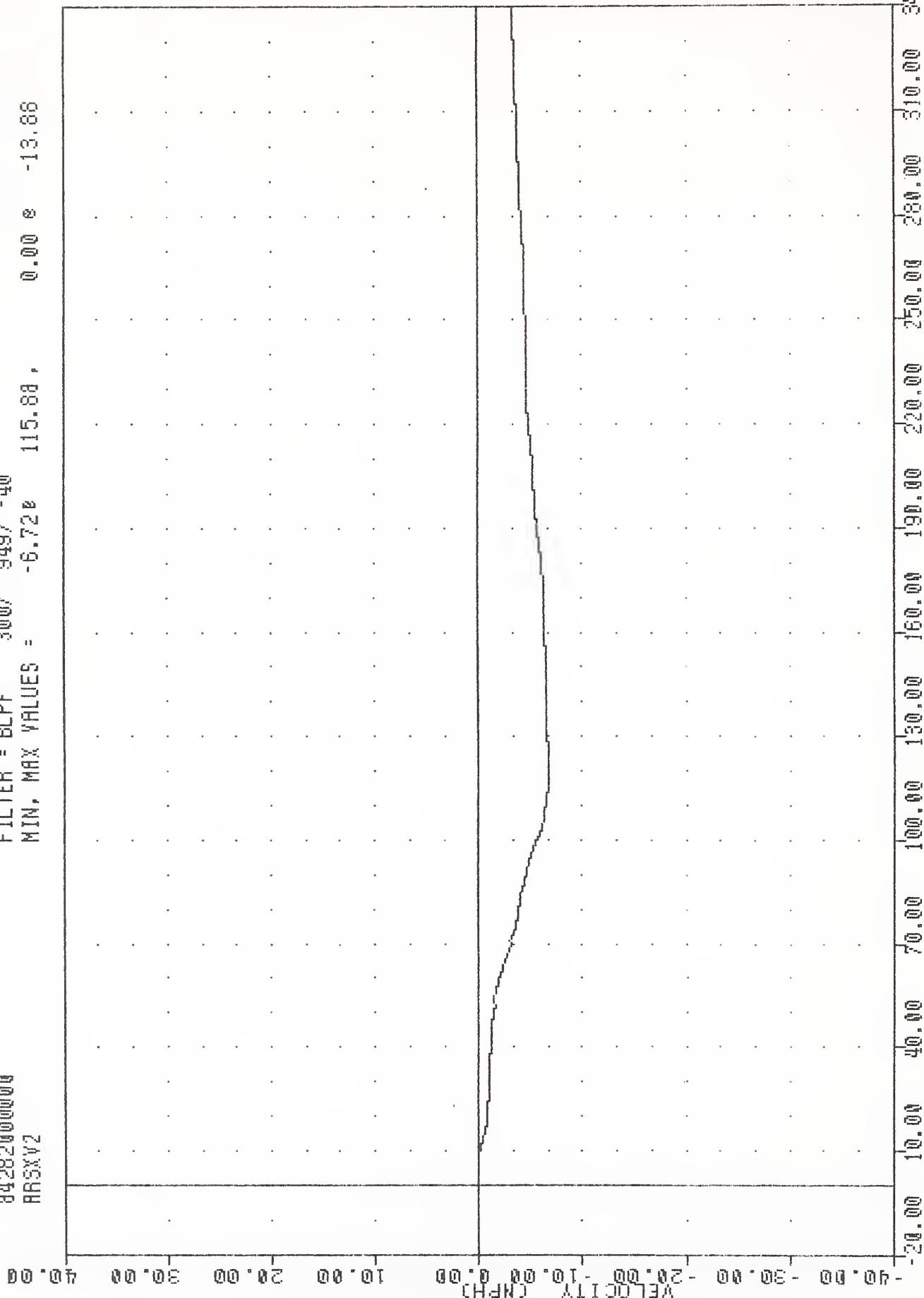
FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.018 -11.75, 21.72 83.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE RIGHT REAR SILL RESULTANT

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 RRSXV2
 PLOT DATE 17-OCT-84 10:18:53
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -6.72e 115.88, 0.00 e -13.88



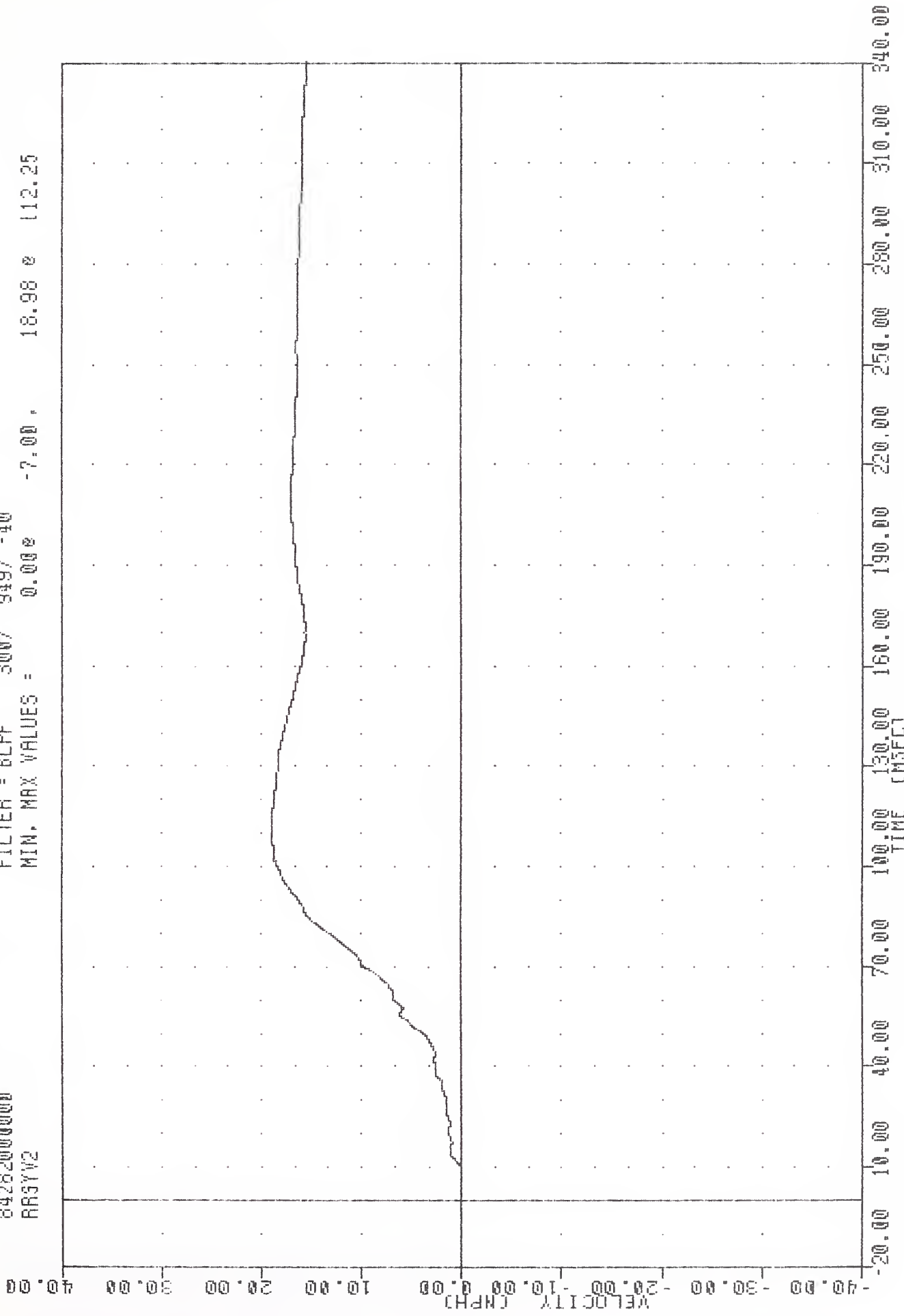
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA W USING RRSXG2

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RRGVV2

PLOT DATE 17-OCT-84 10:18:53

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 0.00e -7.00, 18.98 e 112.25

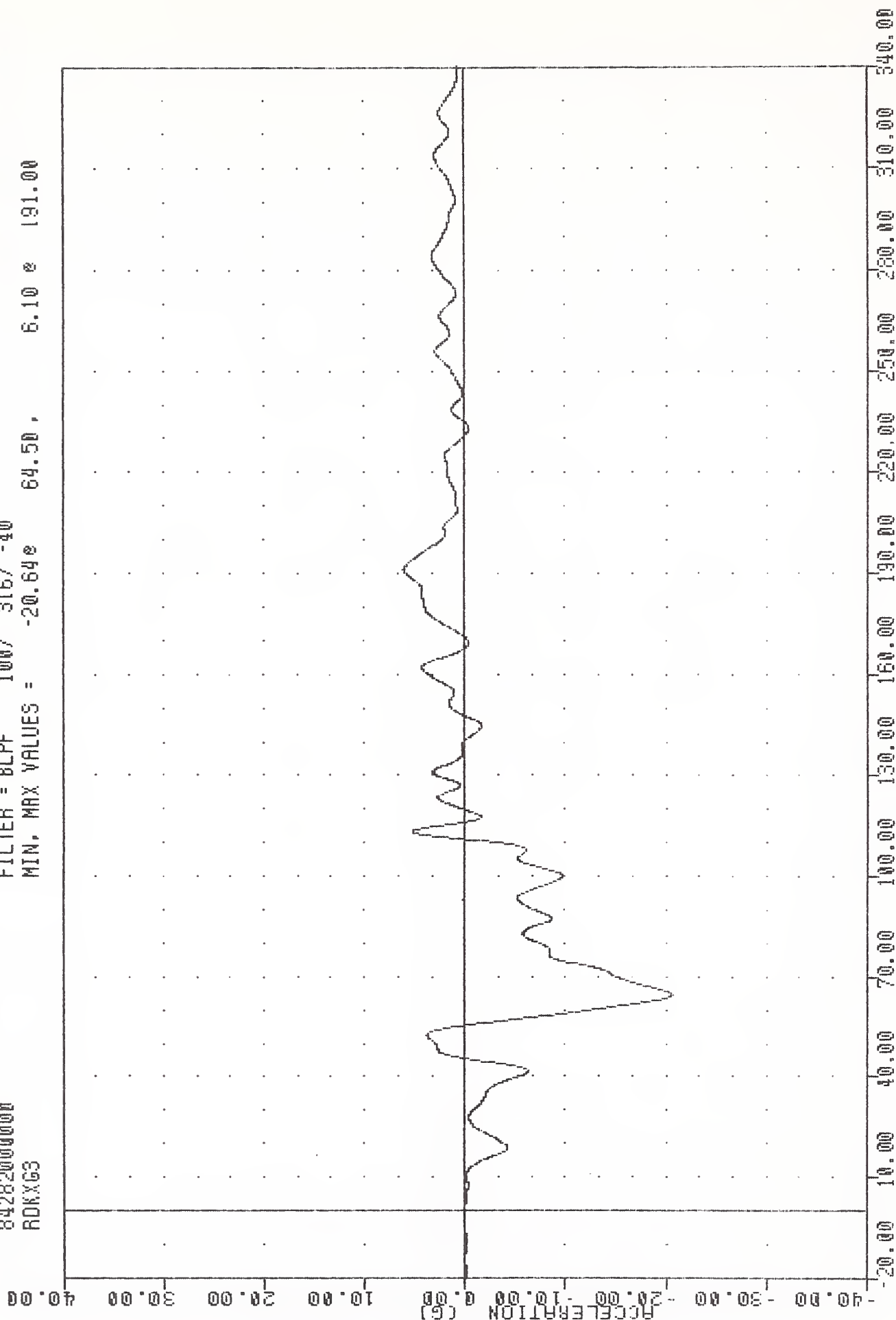


THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RDKXG3

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -20.64e 64.50. 6.10 e 191.00



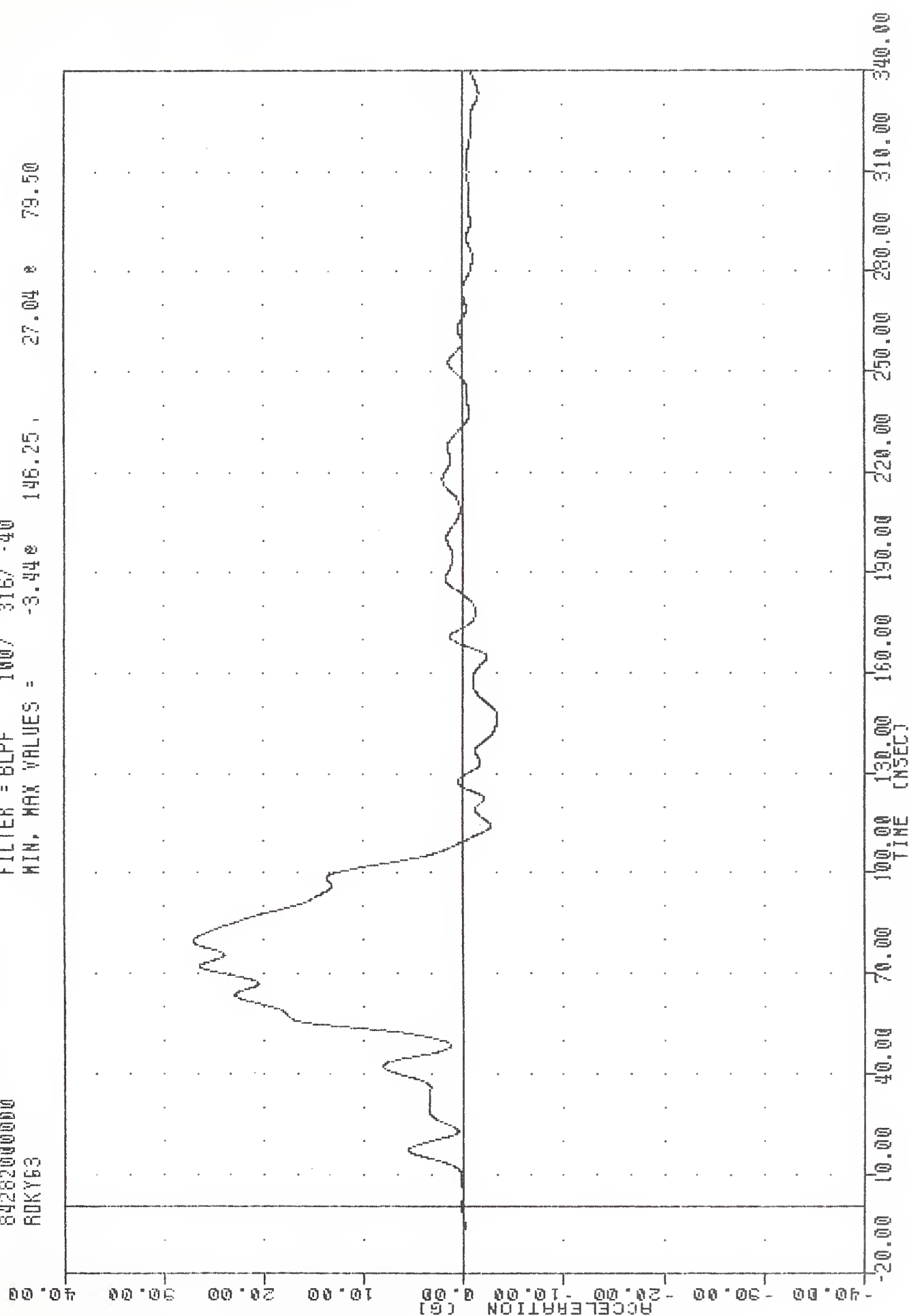
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION X AXIS

PLOT DATE 17-OCT-84 10:16:30

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RDY53

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -3.44e 146.25 , 27.04 e 79.50

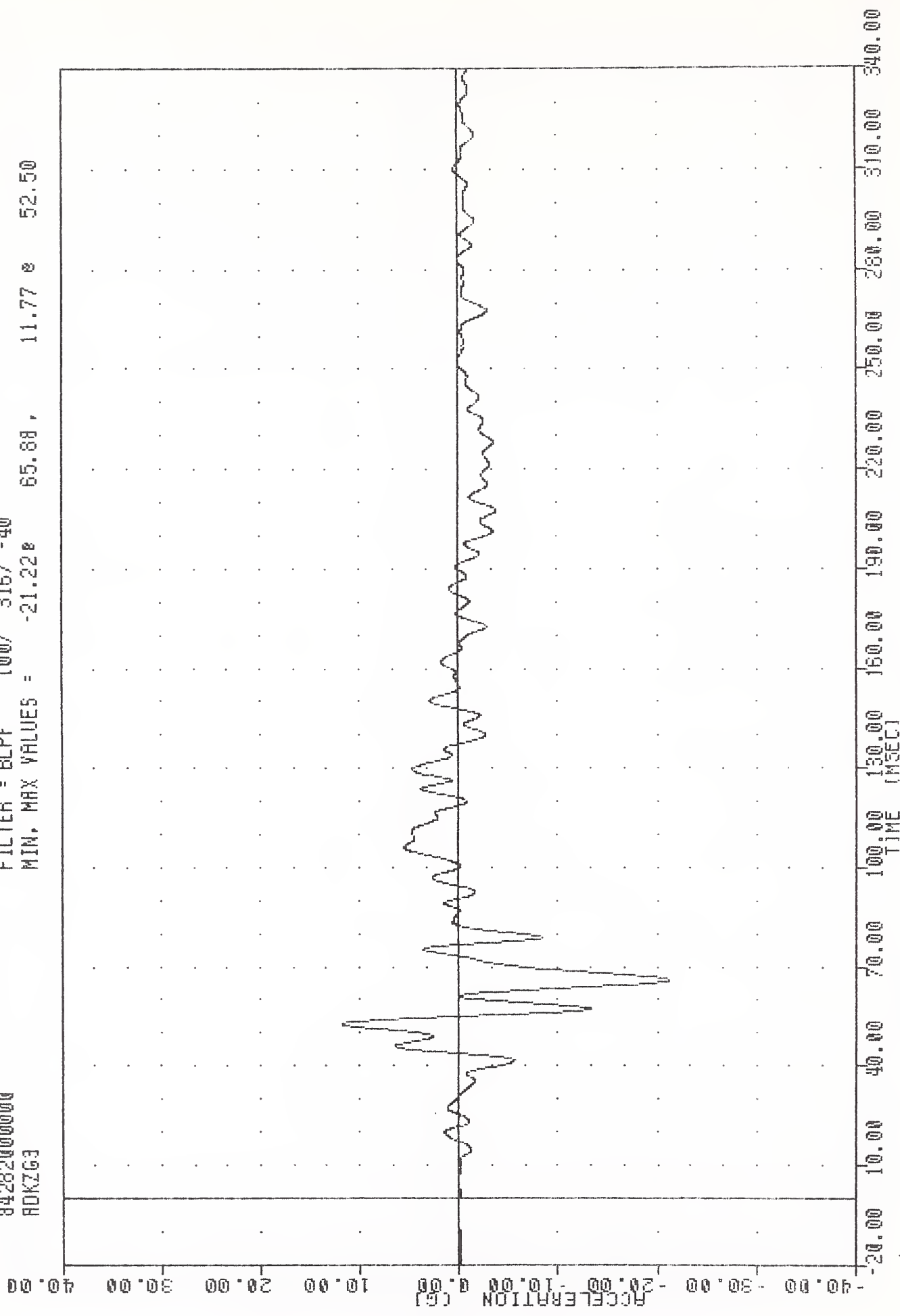


THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RDKZG3

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -21.22g 65.88g 11.77g 52.50



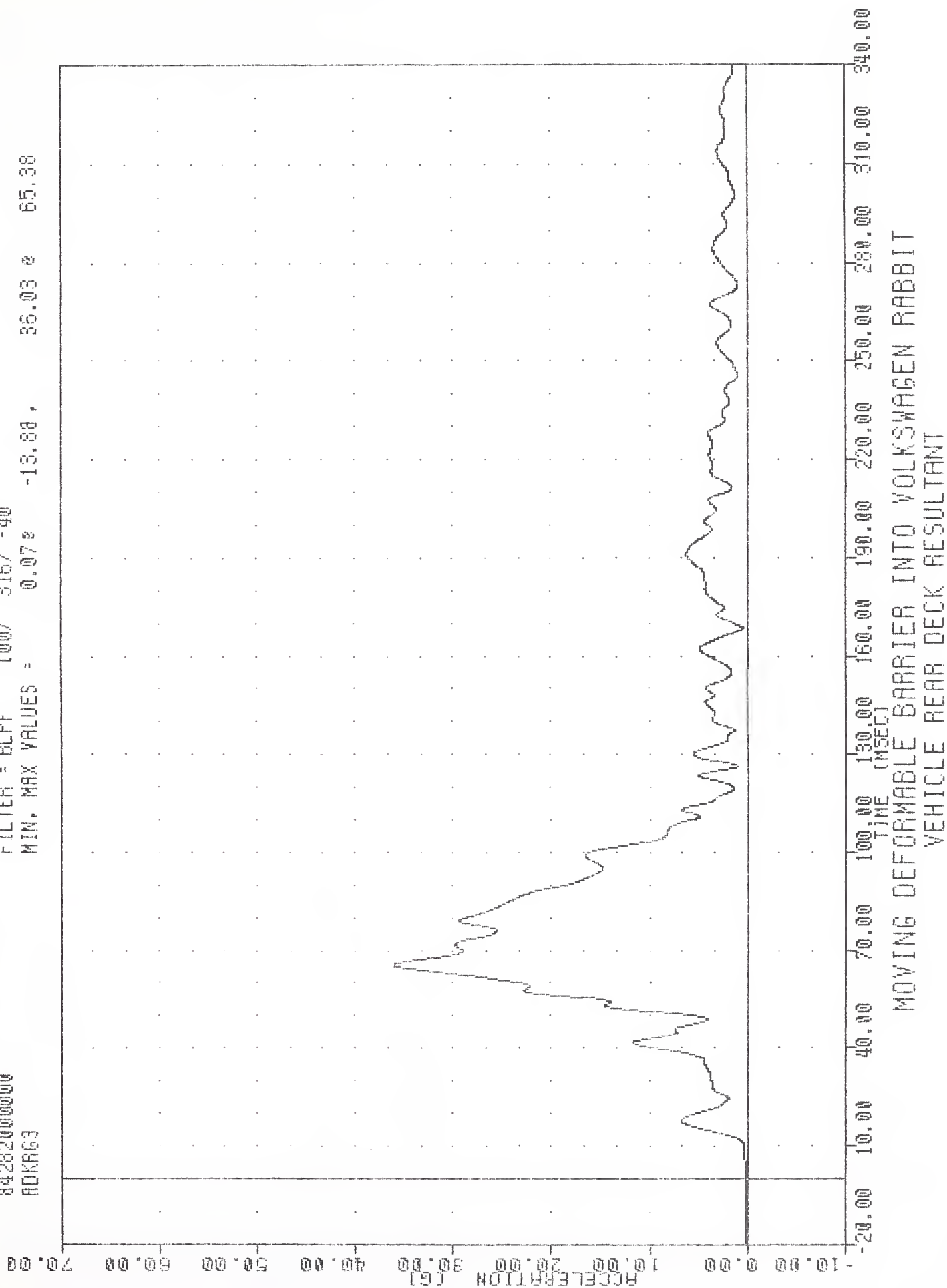
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Z AXIS

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
842820000000
ADKRG3

PLOT DATE 17-OCT-84 10:18:22

FILTER = BLPF 100/ 316/ -40

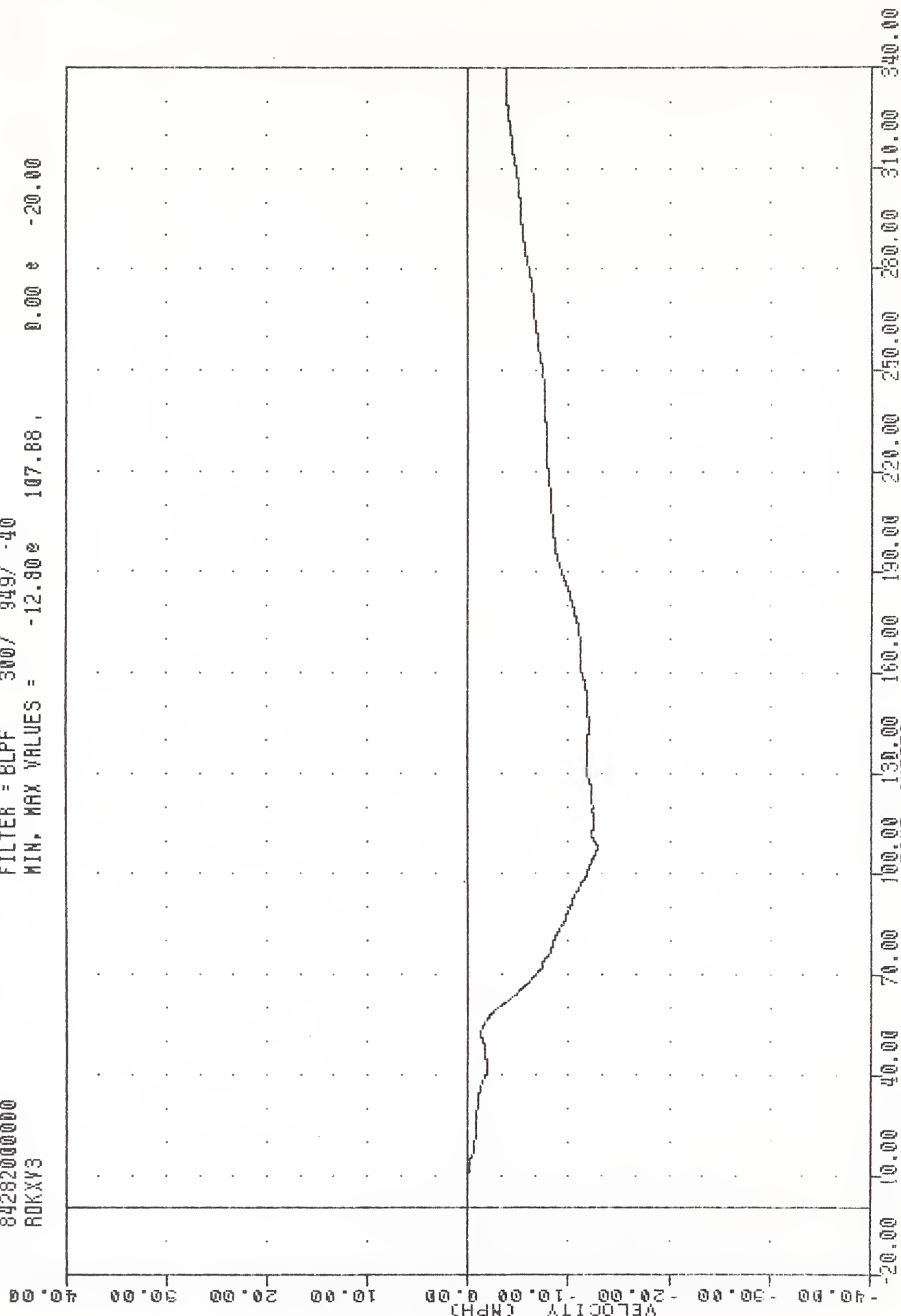
MIN. MAX VALUES = 0.07% -13.88, 36.03 & 65.38



PLUI DATE 17-OCT-84 10:18:53

TRC 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
RDKXV3

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -12.800 107.88 0.00 0 -20.00



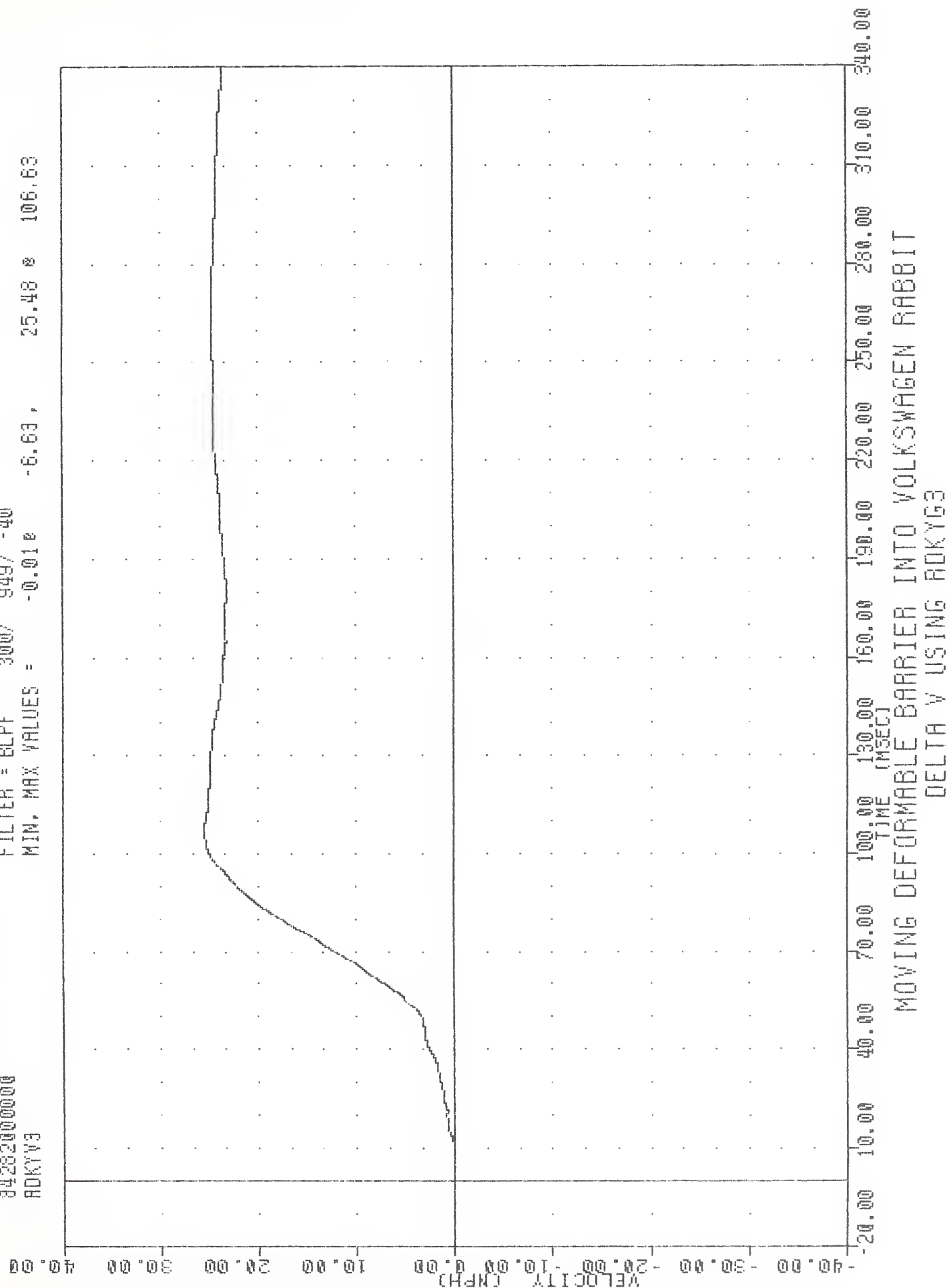
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RDKXG3

THL , 841000
SIDE AGGRESSIVE ATTRIBUTES
84202000000
ADKYV3

PLU1 DR1E 17-OCT-84 10:18:30

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.010 -6.63, 25.48 8 106.63

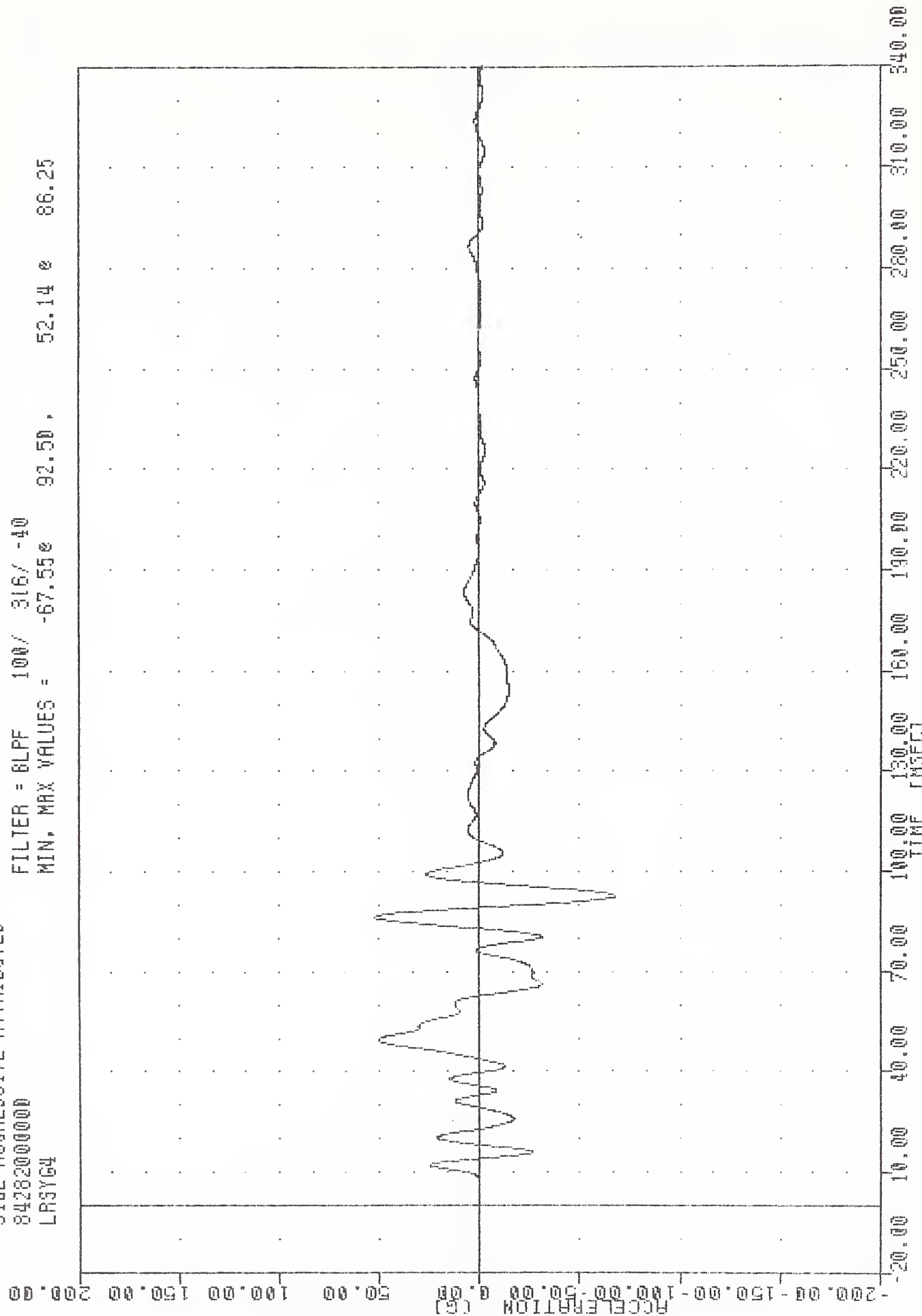


THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LR3YG4

PLU1 DATE 1/-OCT-84 10:16:30

FILTER = 8LPF 100/ 316/ -40

MIN. MAX VALUES = -67.55e 92.50e 52.14e 86.25

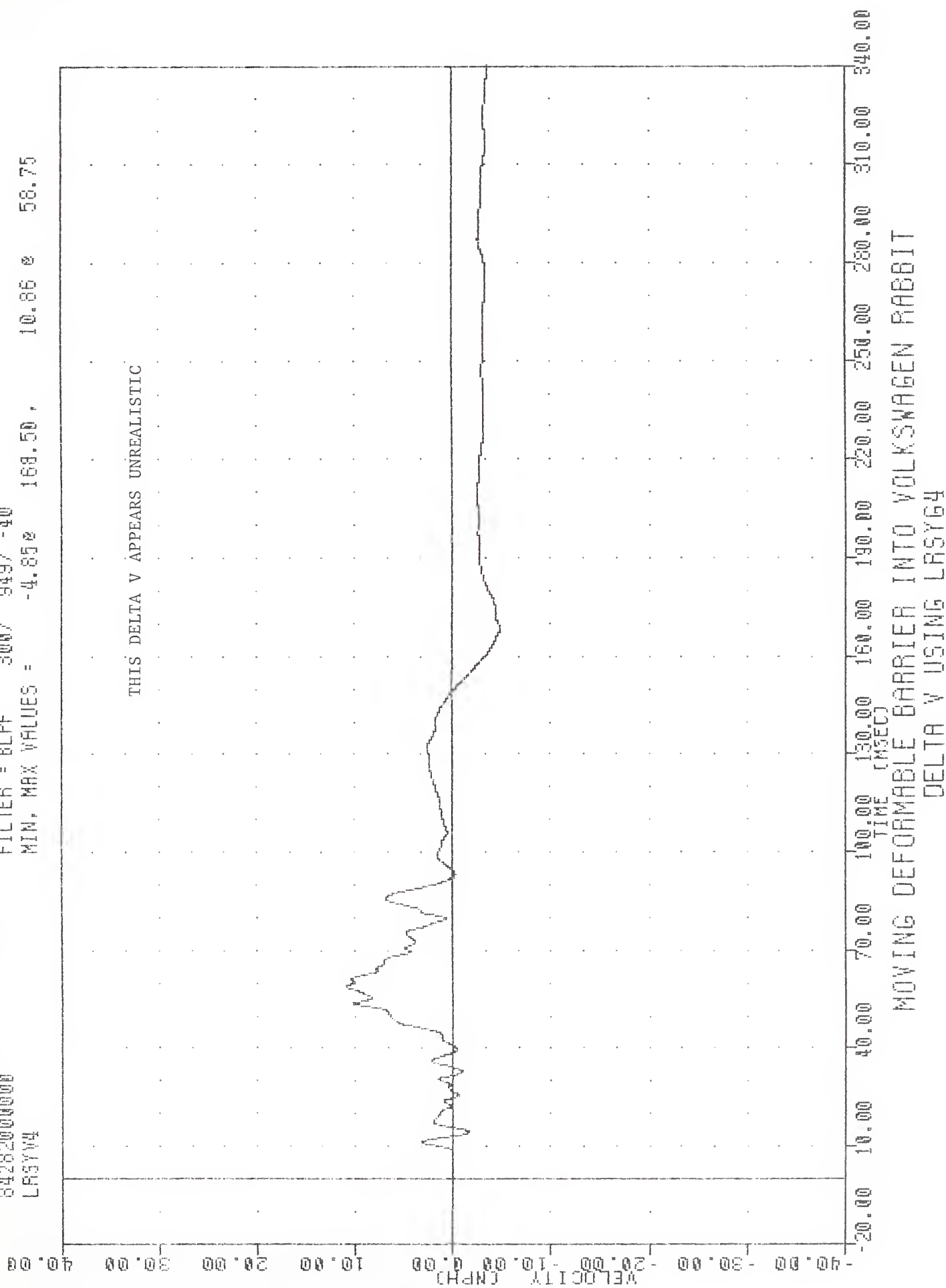


THC . 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LRSYV4

PLU1 DATE 17-OCT-84 14:18:53

FILTER = 8LFF 300/ 949/ -40

MIN, MAX VALUES = -4.850 168.50, 10.86 58.75



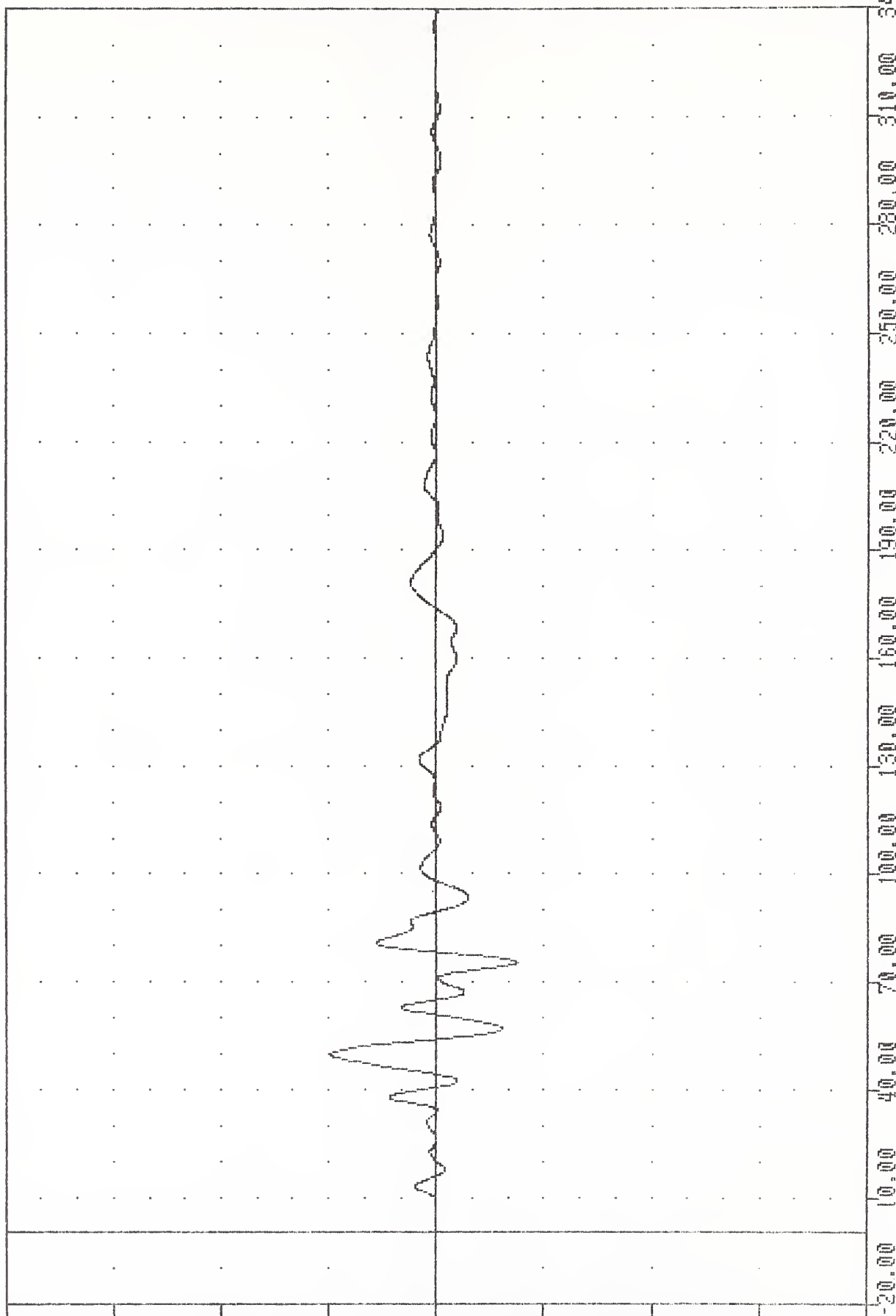
THC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LFSY65

PLU1 DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -37.42 75.25 , 49.56 49.63

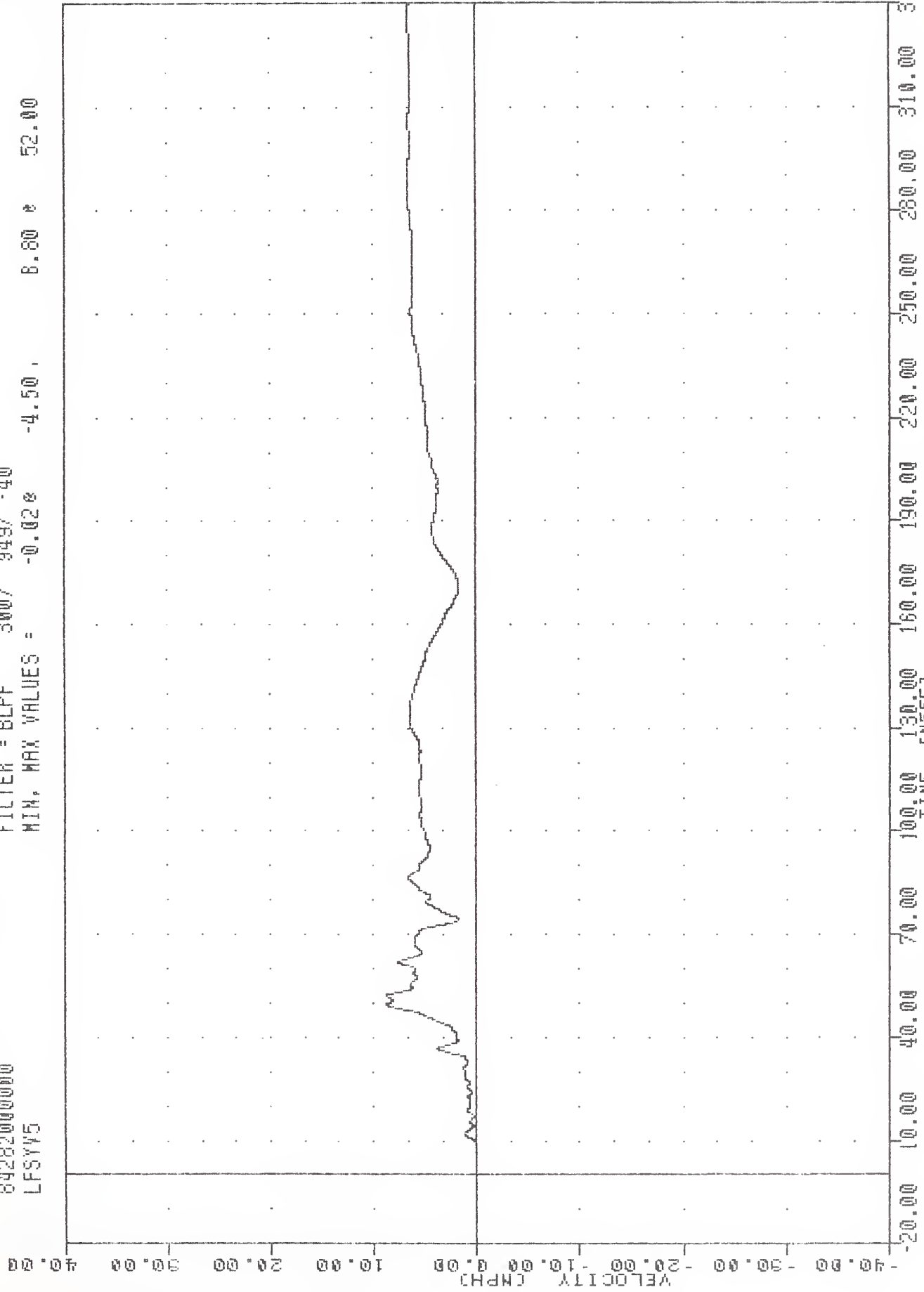
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

TRC .841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LFSYV5

PLU1 DATE 17-OCT-84 10:18:53
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.028 -4.50, 8.80 8 52.00



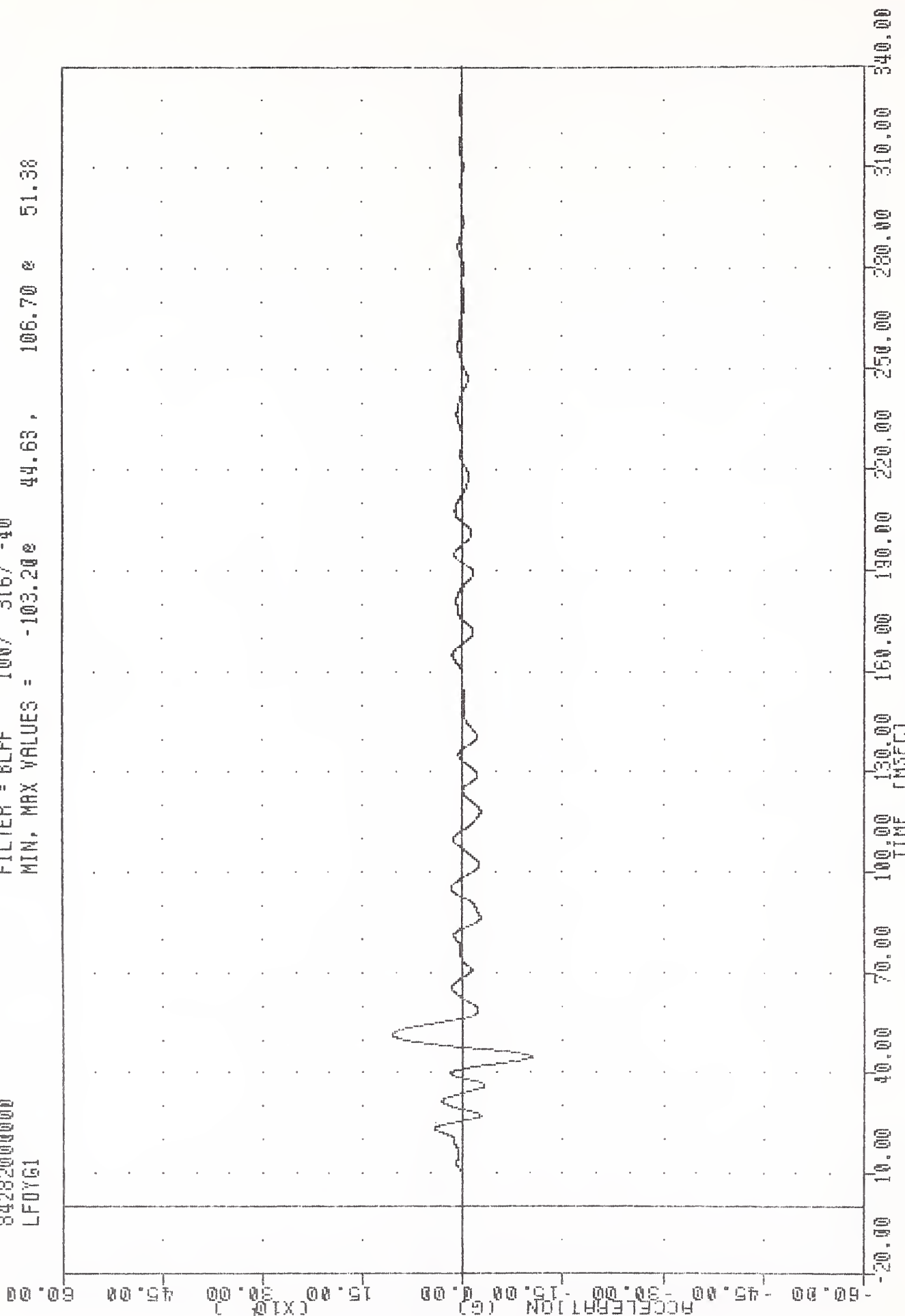
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LFSYG5

TRC , 841003
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LF0Y61

PLU1 DATE 17-OCT-84 10:16:30

FILTER = BLFF 100/ 316/ -40

MIN, MAX VALUES = -103.20e 44.63, 106.70 e 51.38



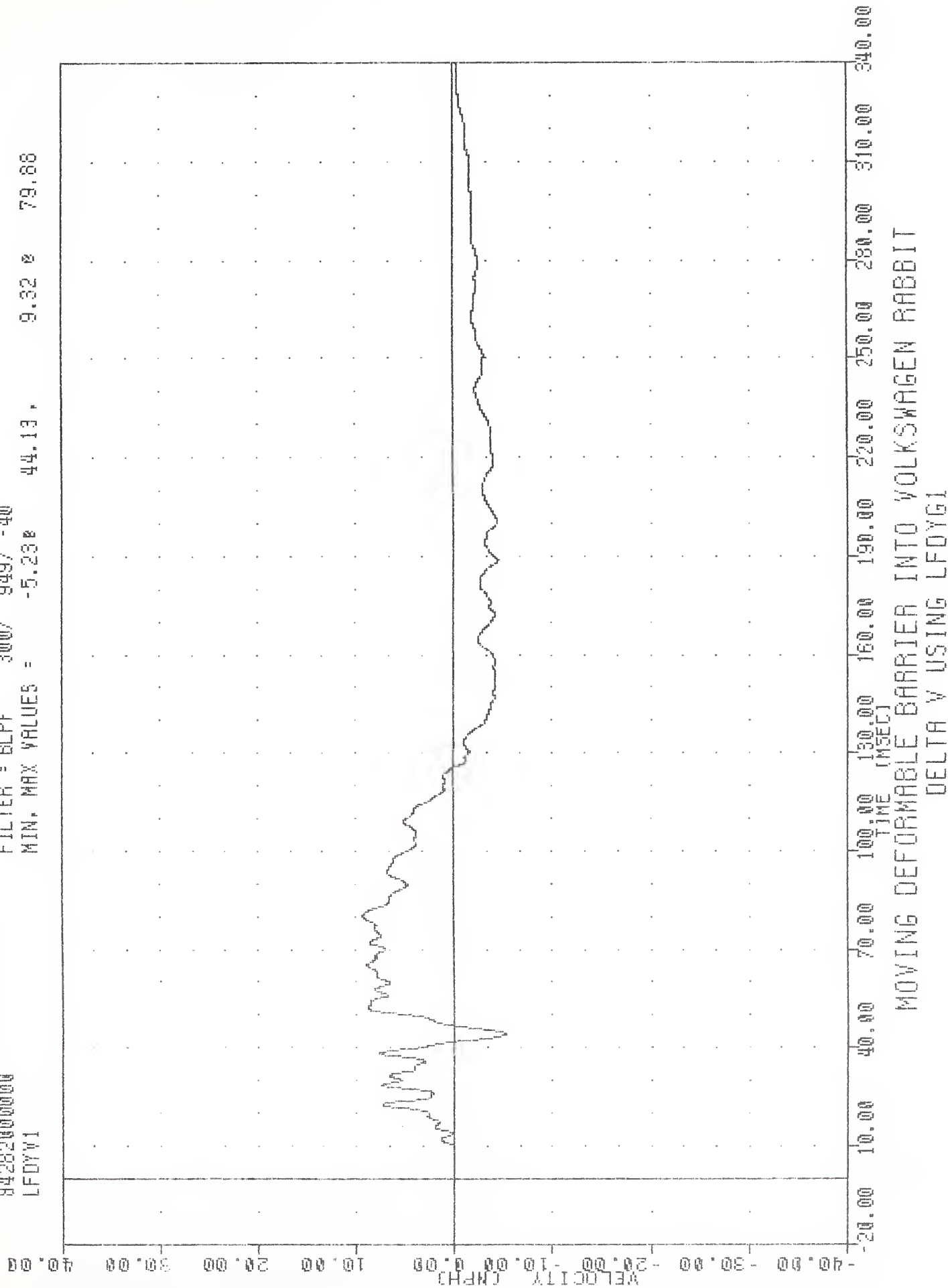
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 6) ACCELERATION Y AXIS

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LFDYV1

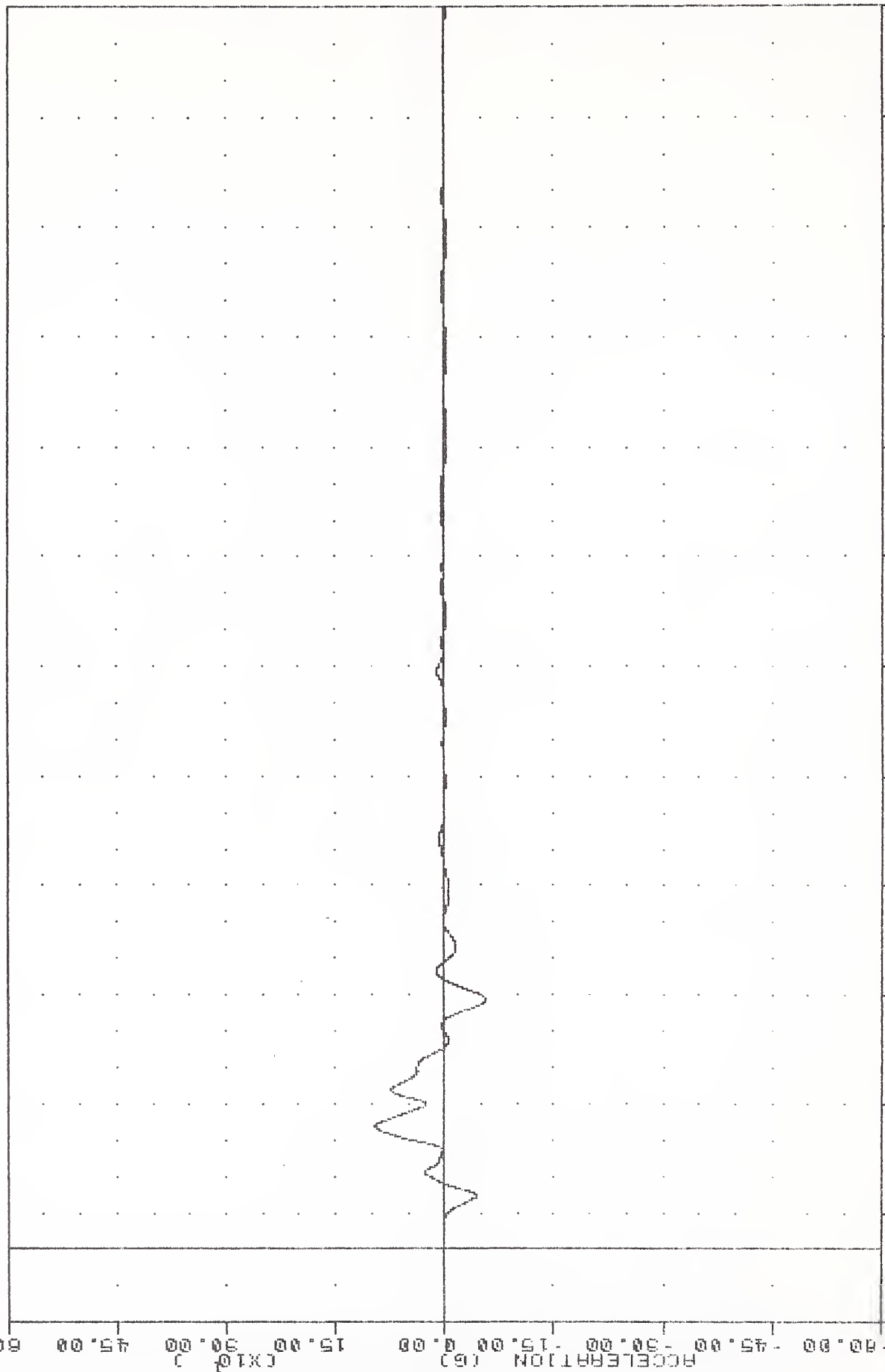
PLU1 DATE 17-OCT-84 10:18:53

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -5.230 44.13, 9.32 0 79.88



THC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LFDY62
 PLU1 DATE 17-OCT-84 10:16:30
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -56.56 68.50 95.08 33.63



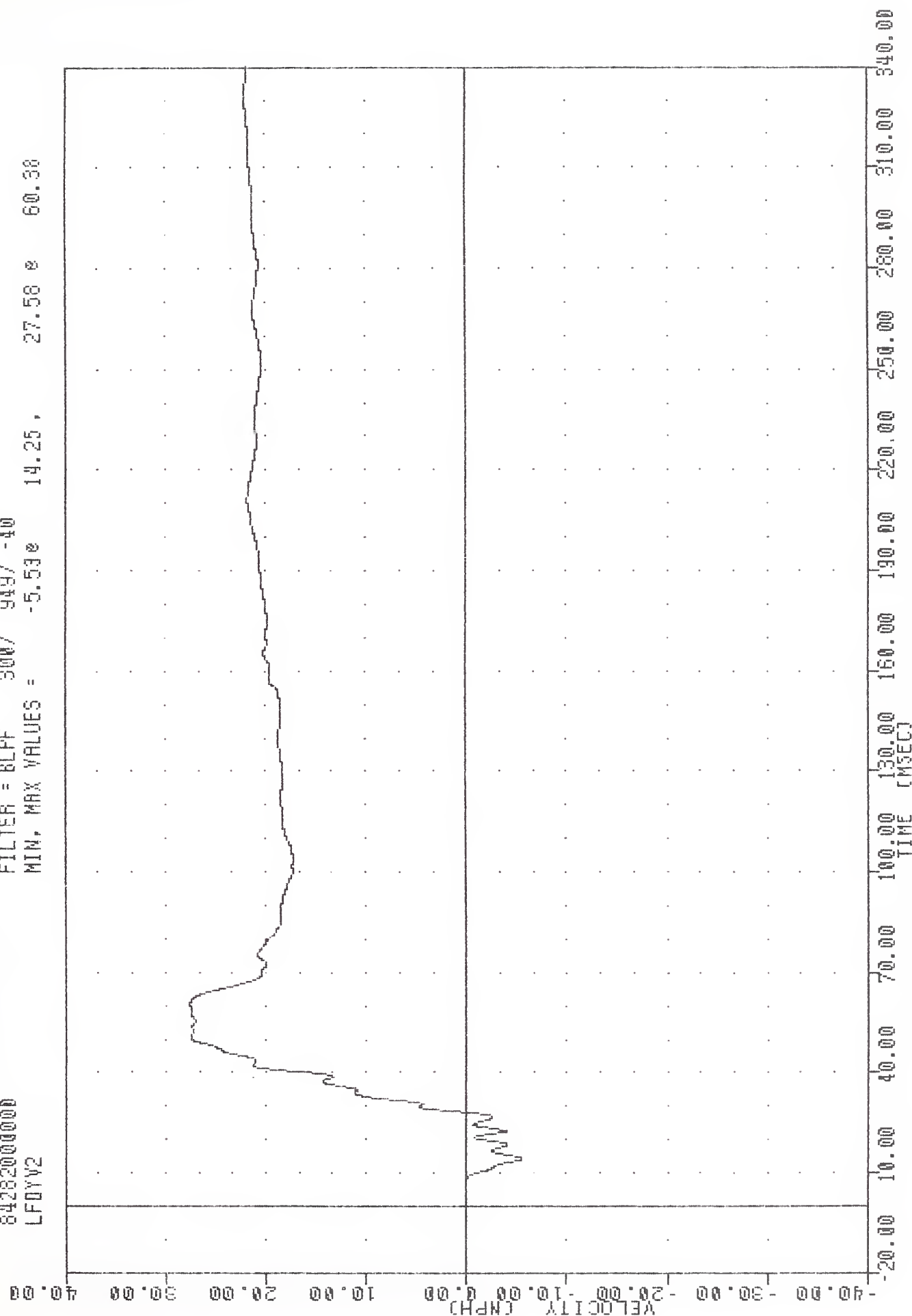
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS

PLU1 DATE 17-UCT-84 10:18:53

THC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LFDYV2

FILTER = 8LPF 300/ 949/ -40

MIN, MAX VALUES = -5.53e 14.25, 27.58 e 60.38



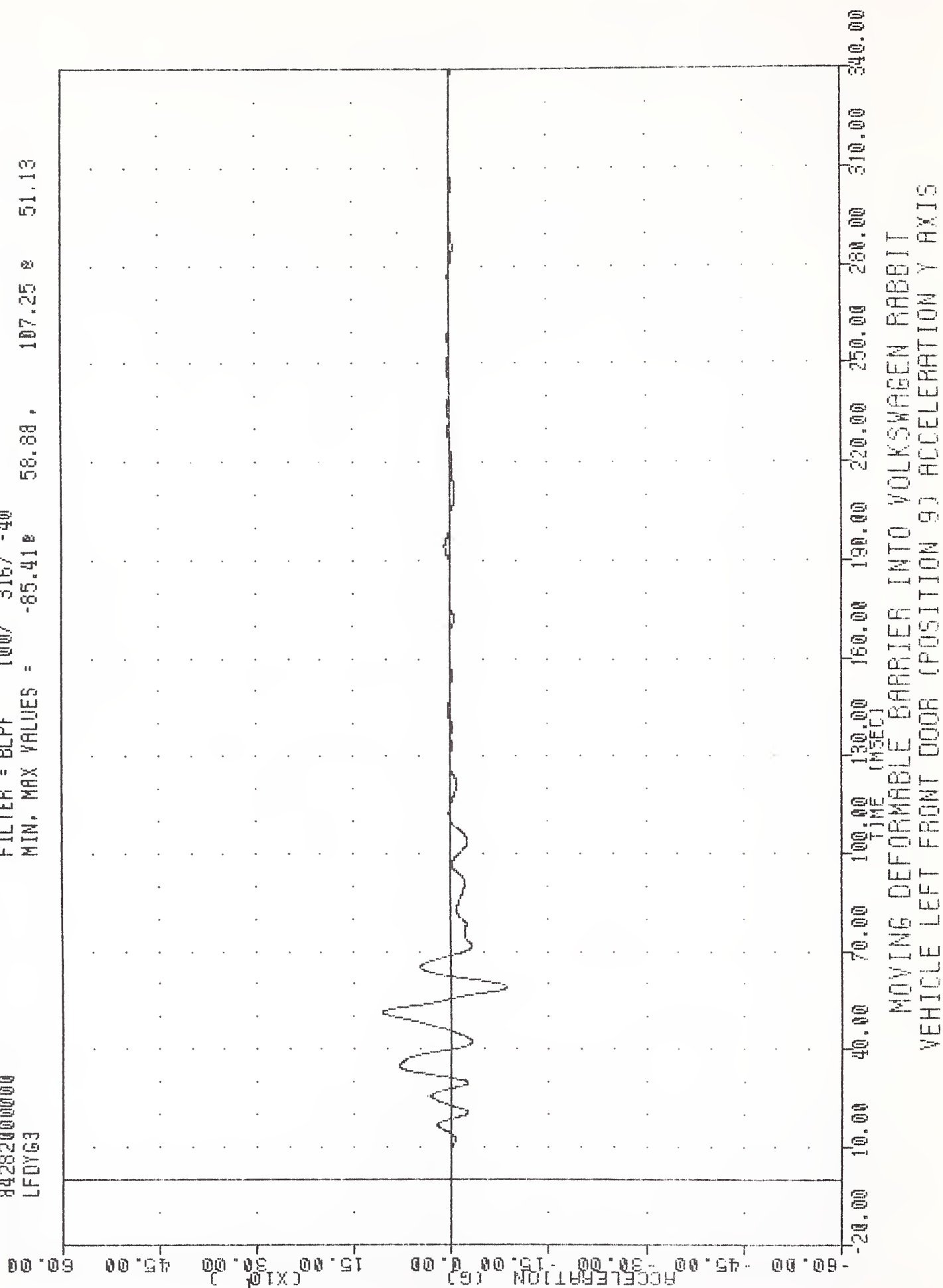
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDY62

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LFDY63

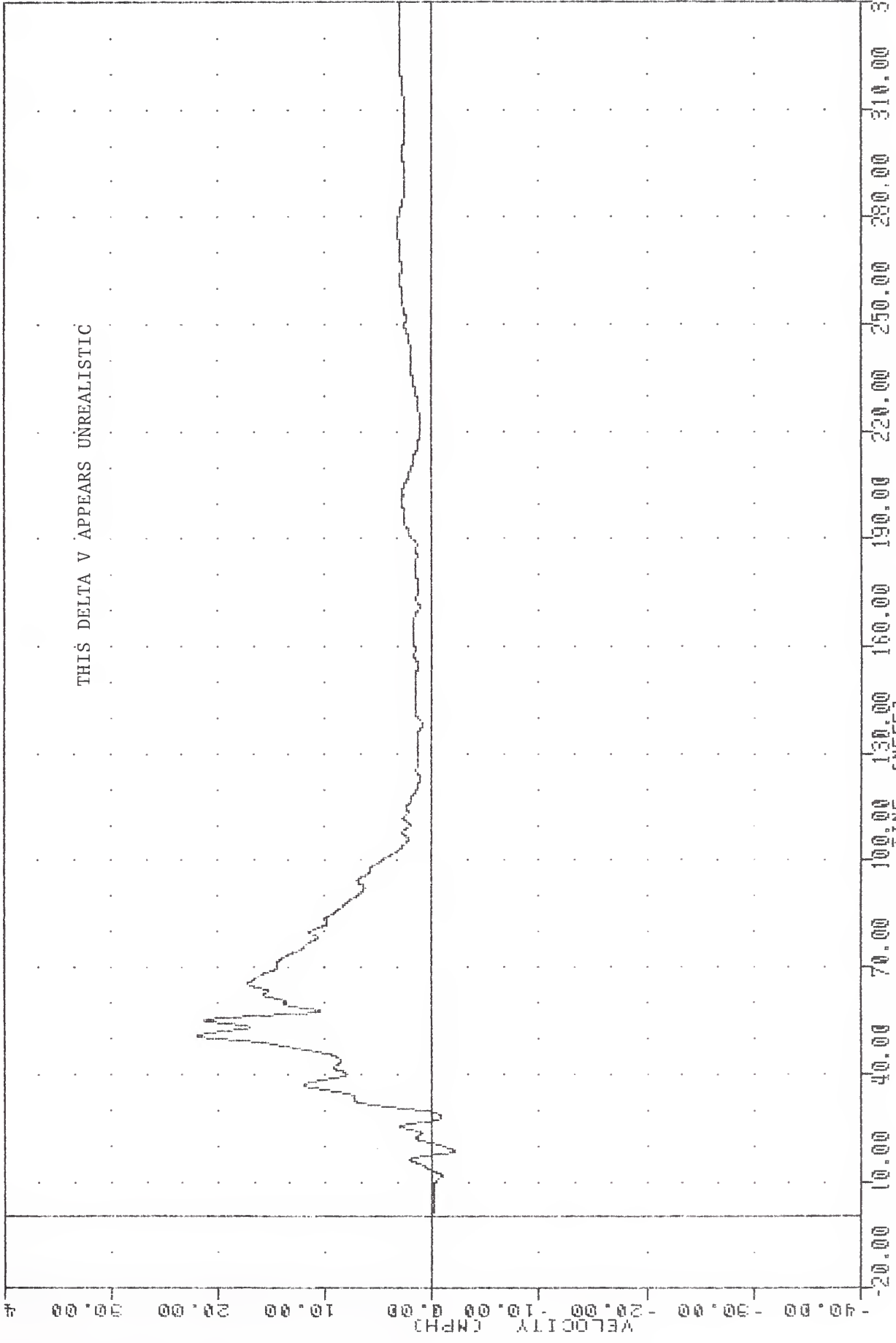
PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -85.41% 58.88 , 107.25 % 51.13



TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 LFDYV3
 PLOT DATE 17-OCT-84 10:18:53
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -2.10e 18.38 , 21.84 e 50.63



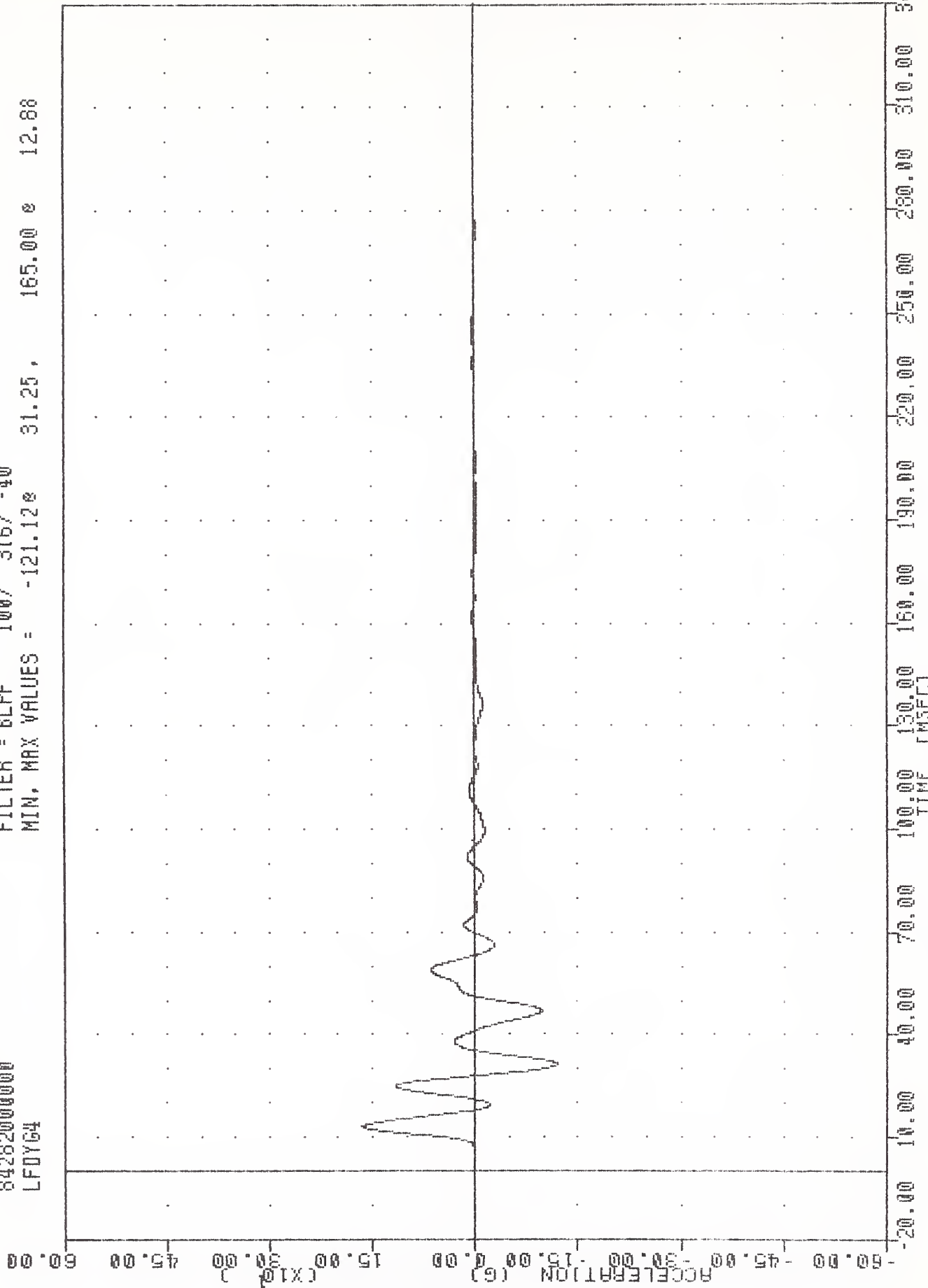
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LFDYV3

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LFDY64

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -121.128 31.25, 165.00 8 12.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 10) ACCELERATION Y AXIS

TRC
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LFDYV4

PLU1 DATE 17-UCT-84 10:18:53

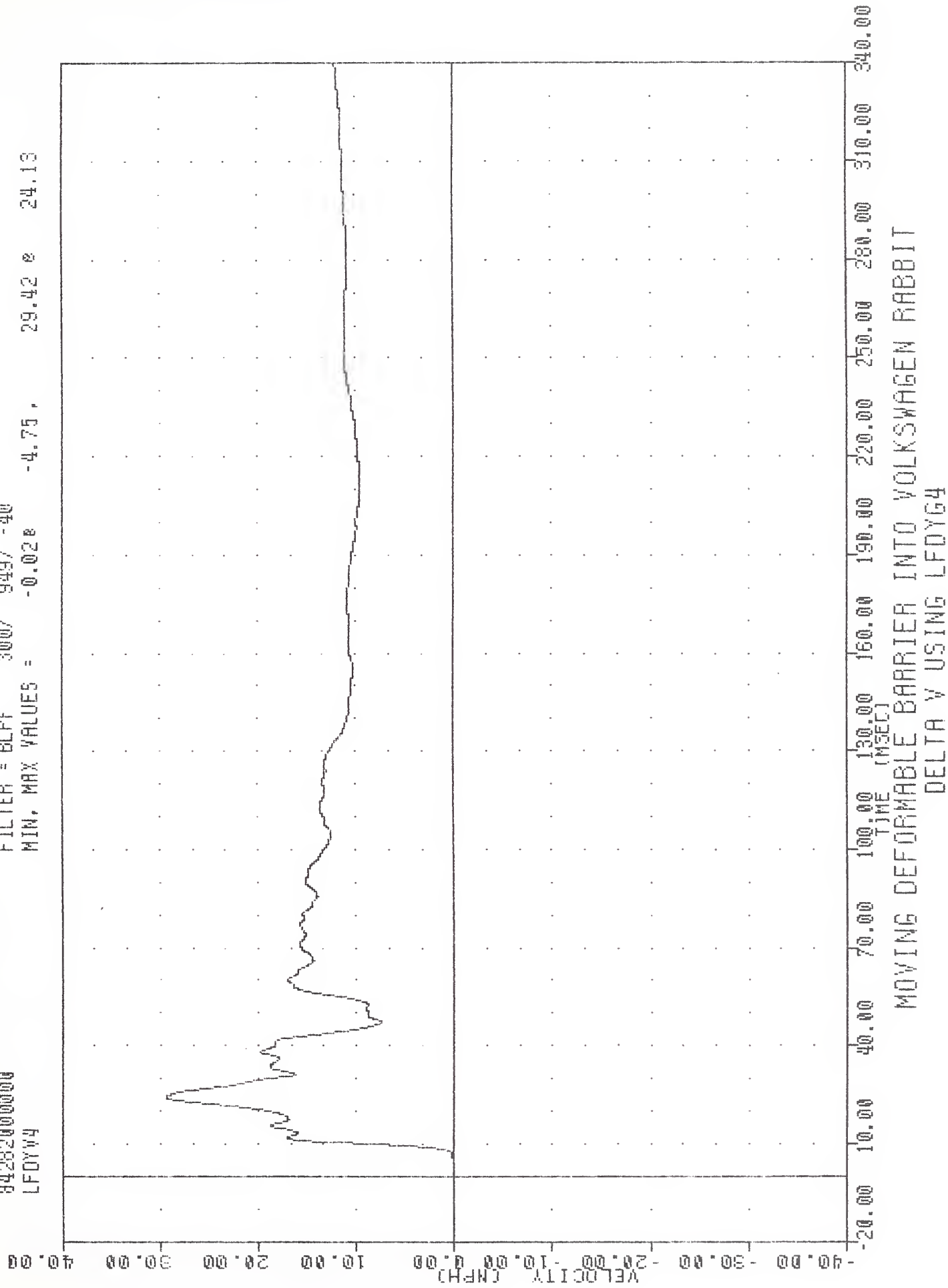
FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.020

-4.75,

29.42 0

24.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYV4

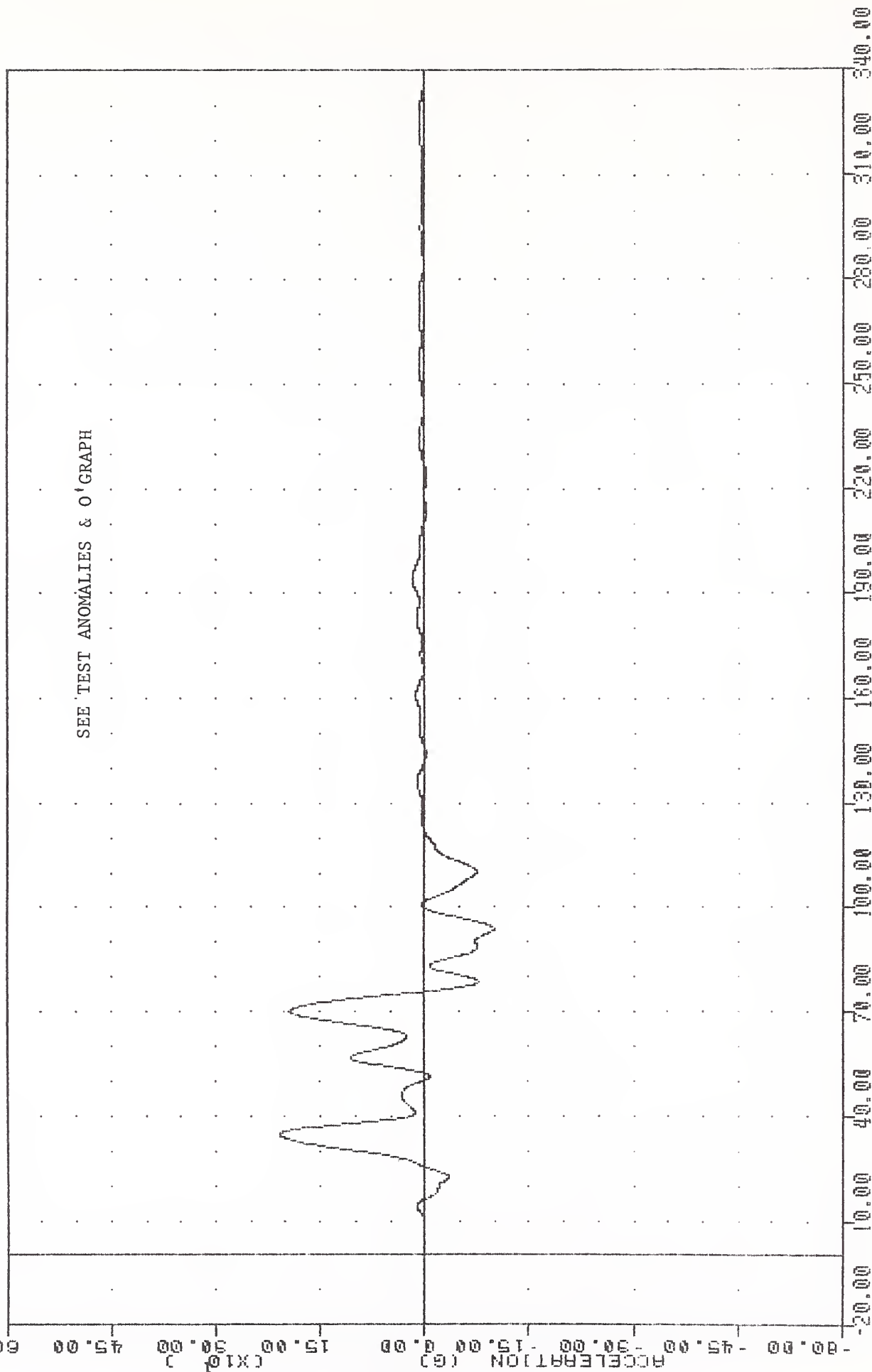
TAC 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 LFDY65

PLU1 DATE 17-UCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -100.018 93.75, 209.13 e 34.63

SEE TEST ANOMALIES & O'GRAPH



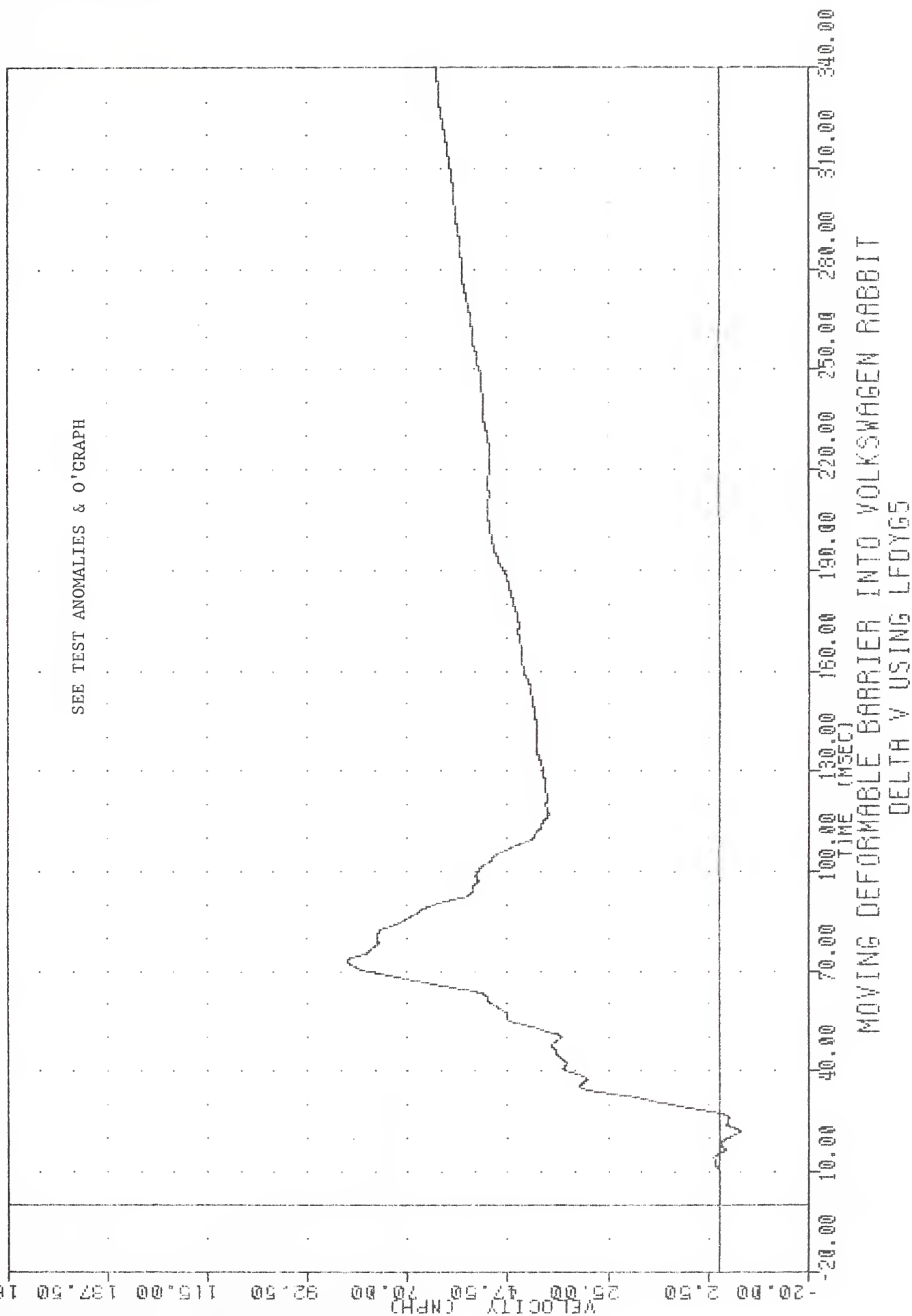
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 11) ACCELERATION Y AXIS

TRC .841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
LFDYV5

PLOT DATE 18-OCT-84 16:14:32

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -4.64 21.75, 83.69 73.13

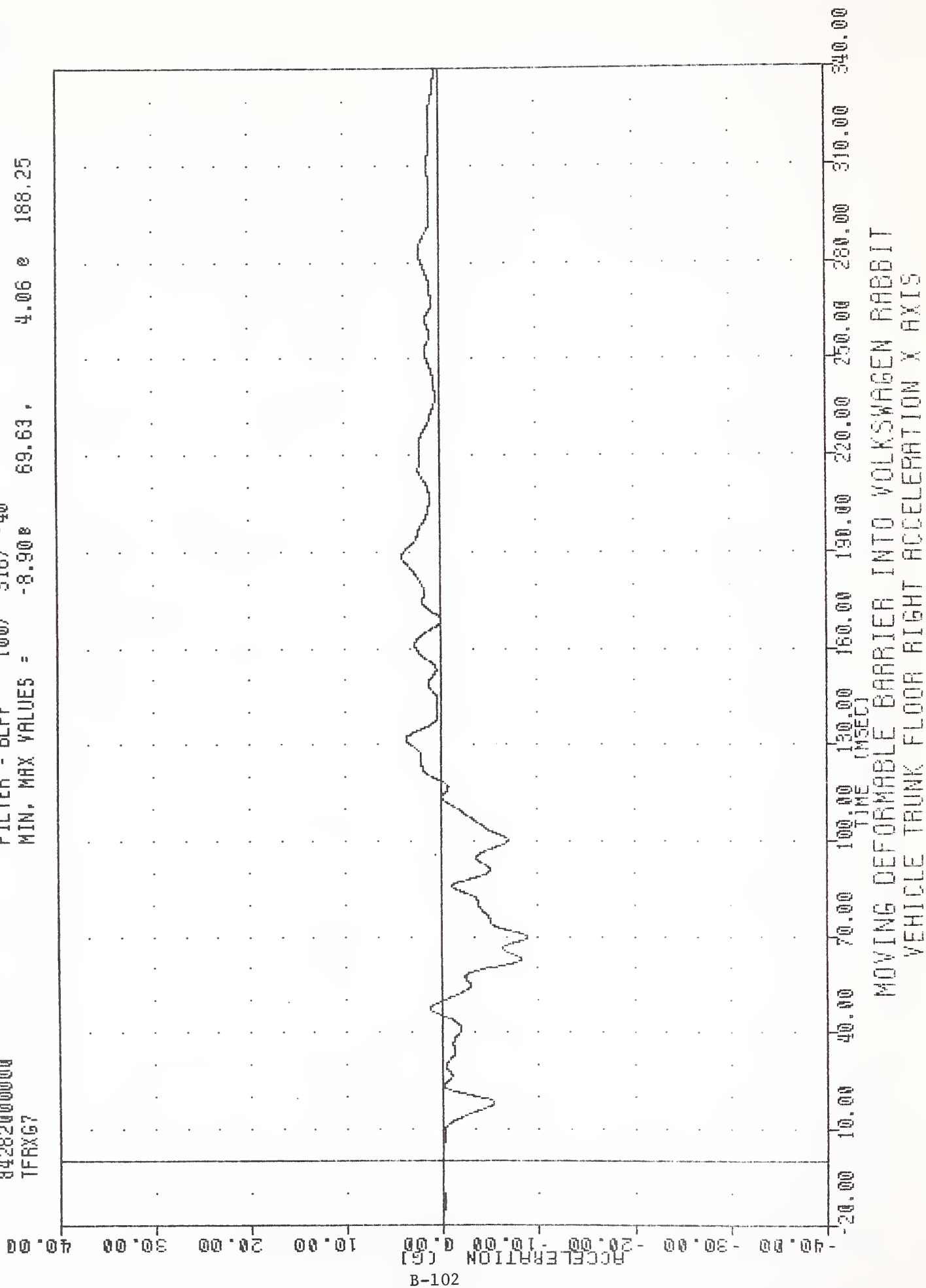


TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
TFRXG7

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -8.90E 69.63, 4.06 E 188.25

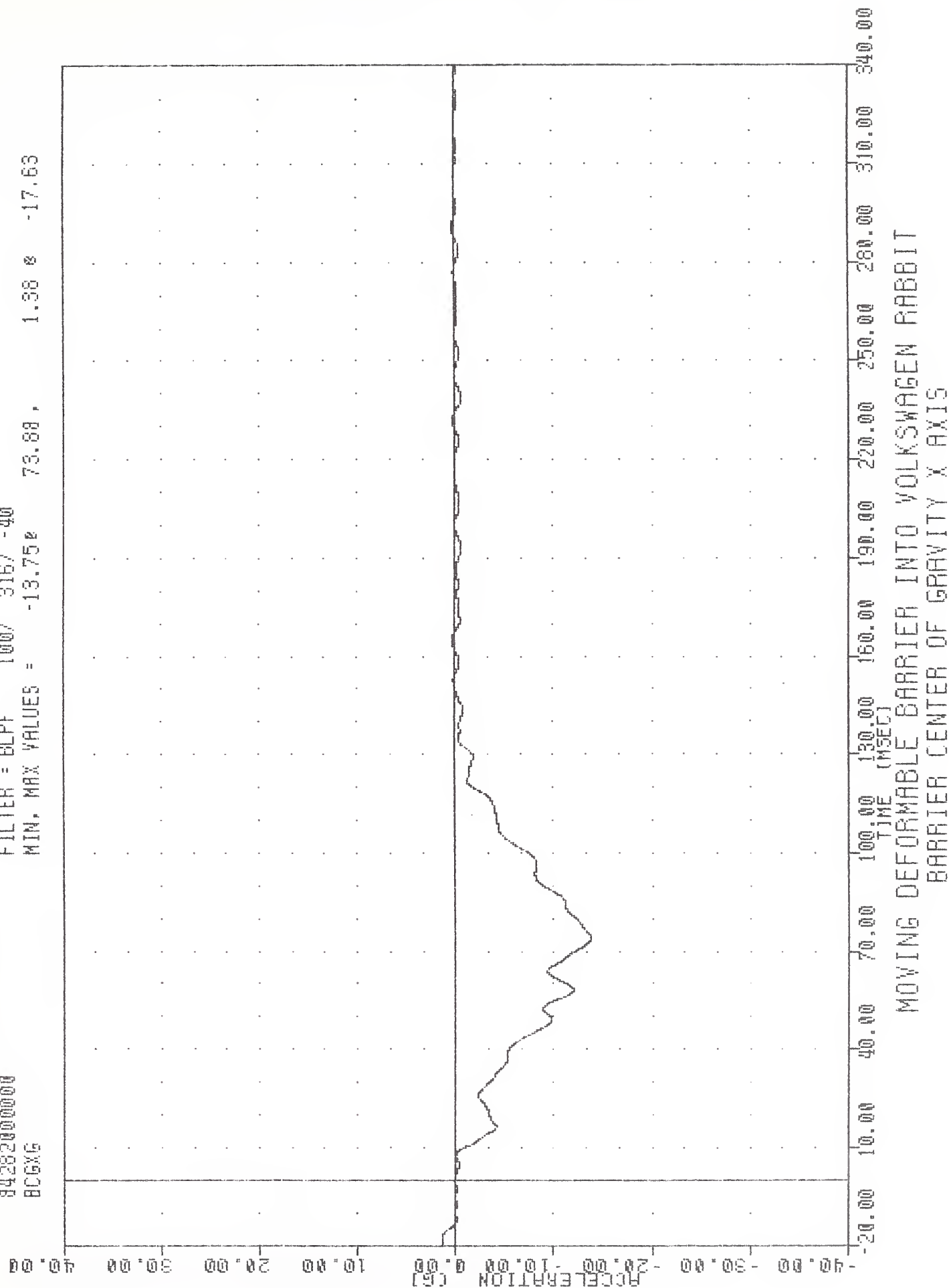


TRC , 841003
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 BC6XG

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 315/ -40

MIN. MAX VALUES = -13.75e 73.88 , 1.38 e -17.63

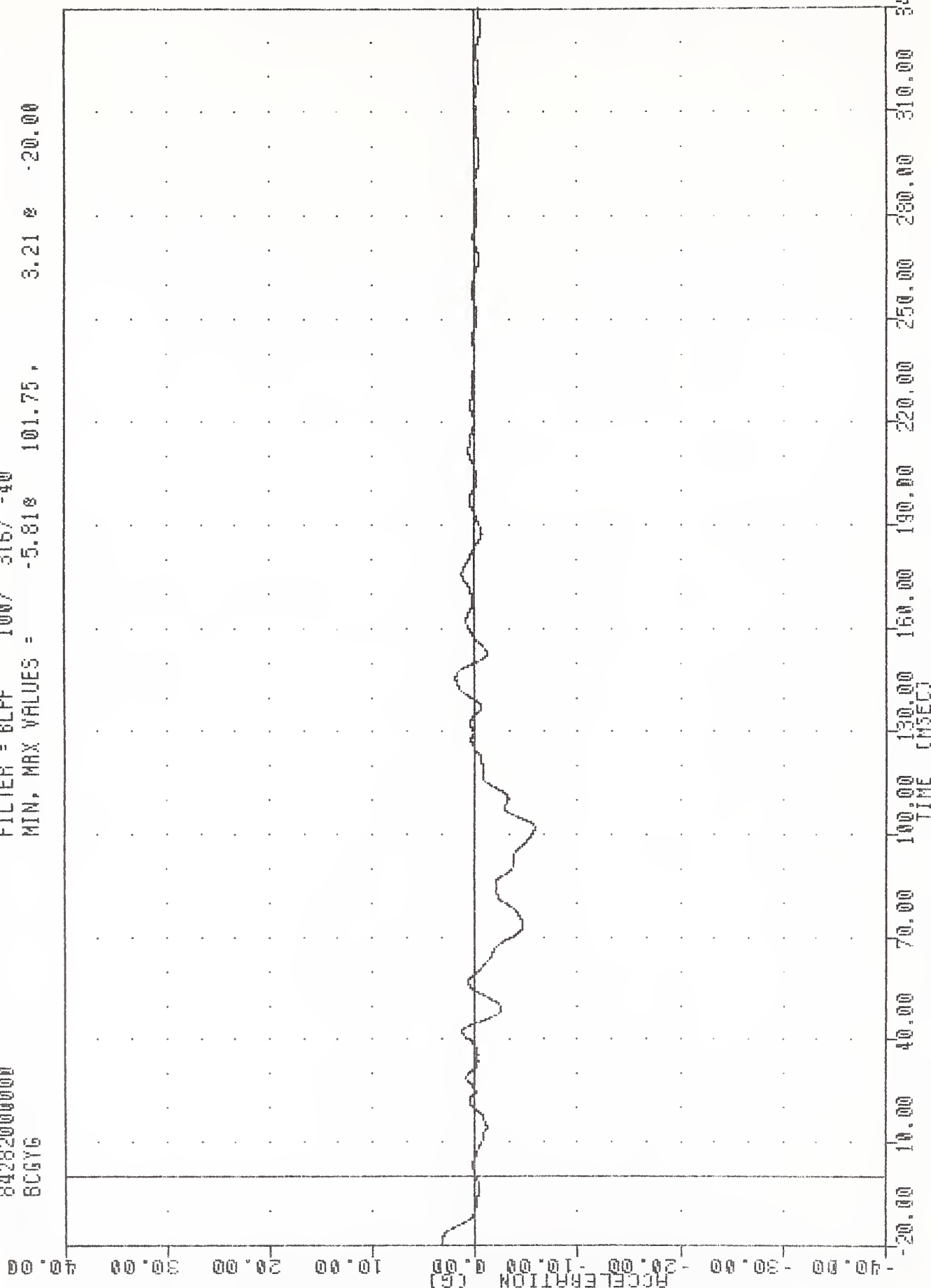


```

PLOT DATE      17-OCT-84      10:16:30
FILTER = 6LPF      100/      316/      -40
MIN, MAX VALUES = -5.818      10

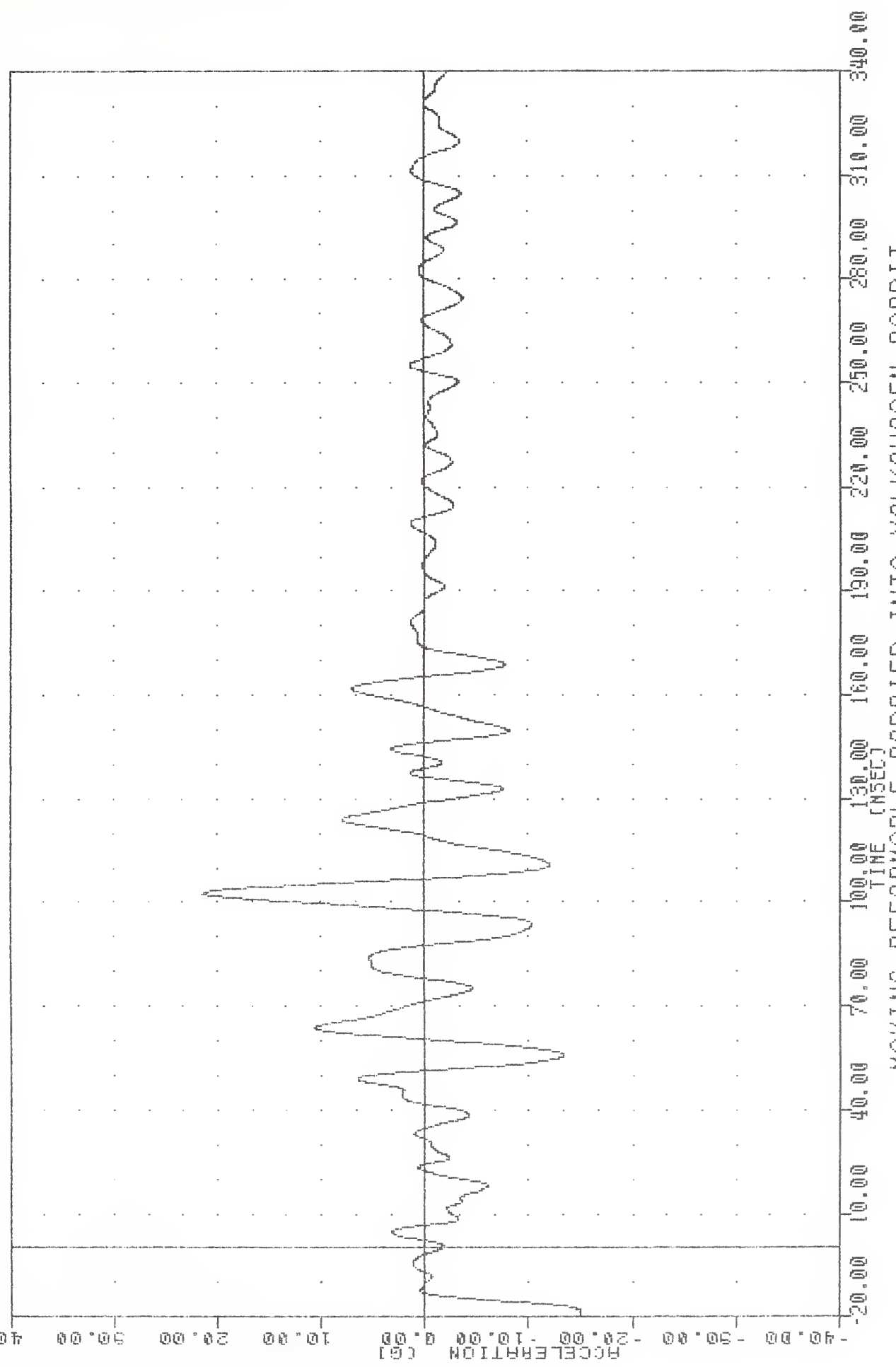
```

FILTER = 6LPF	100/ 316/ -40	
MIN, MAX VALUES =	-5.81s	101.75 s
		3.21 s
		-20.00



THE EFFECT OF A
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Y AXIS

TAC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 80676
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -14.98e -20.00, 21.37 e 102.50
 PLOT DATE 17-OCT-84 10:16:30



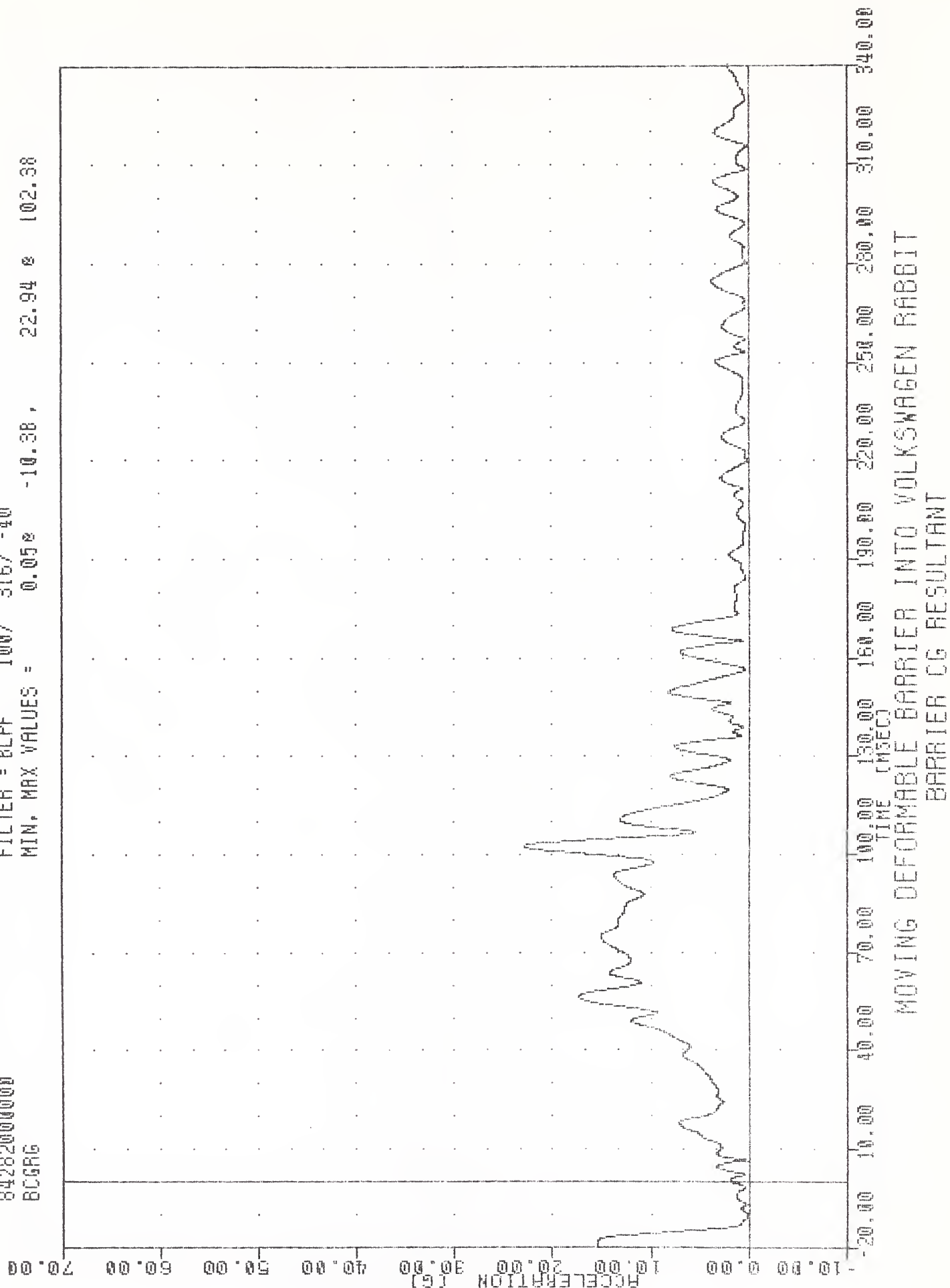
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 BARRIER CENTER OF GRAVITY Z AXIS

TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 BCGRG

PLU1 DATE 17-OCT-84 10:18:22

FILTER = BLPF 100/ 318/ -40

MIN. MAX VALUES = 0.058 -10.38 , 22.94 8 102.38

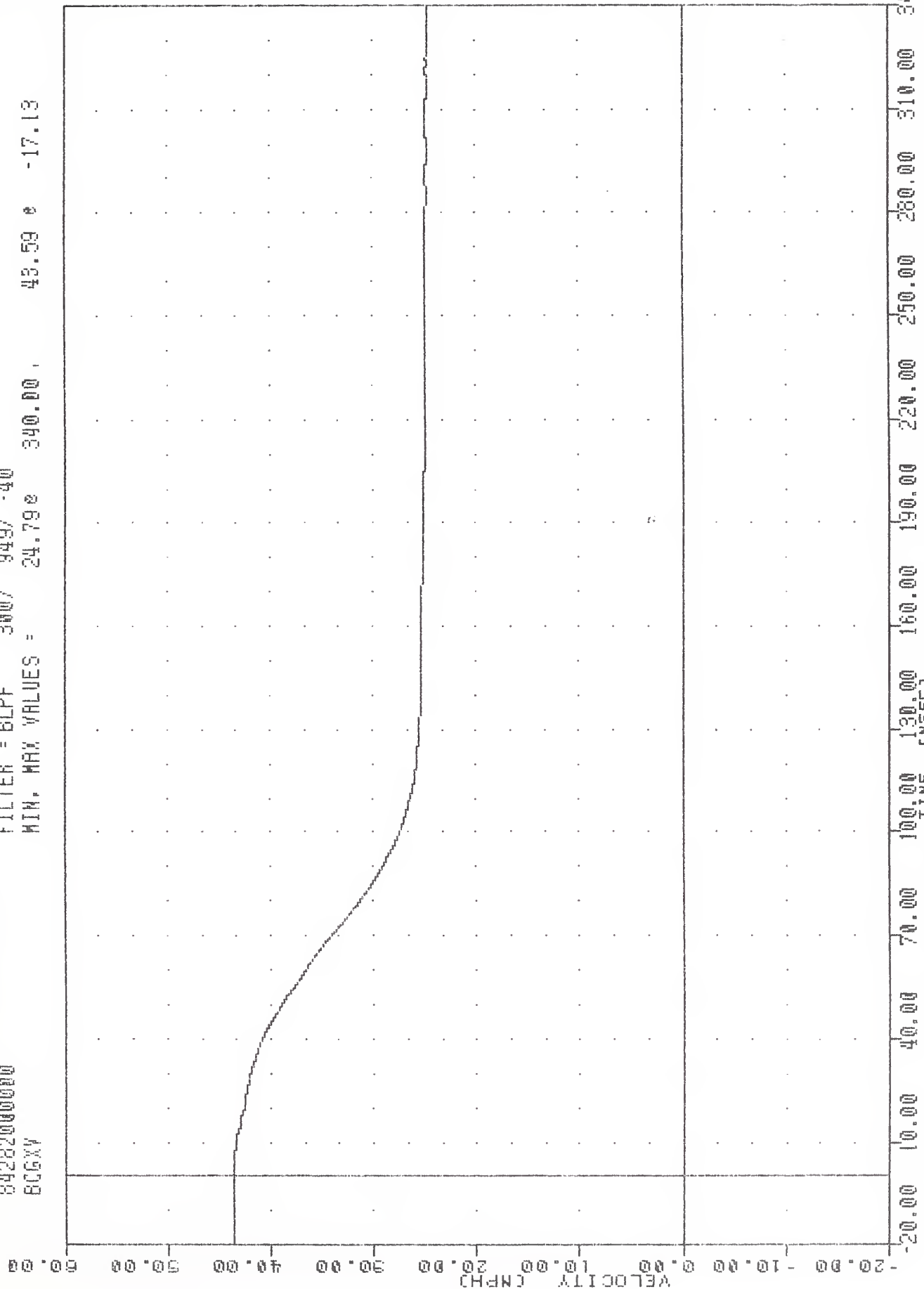


THC , 841006
 SIDE AGGRESSIVE ATTRIBUTES
 84282000000
 BCGXY

PLU1 DATE 17-OCT-84 10:18:53

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 24.79e 340.00 , 43.59 e -17.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING BCGXG

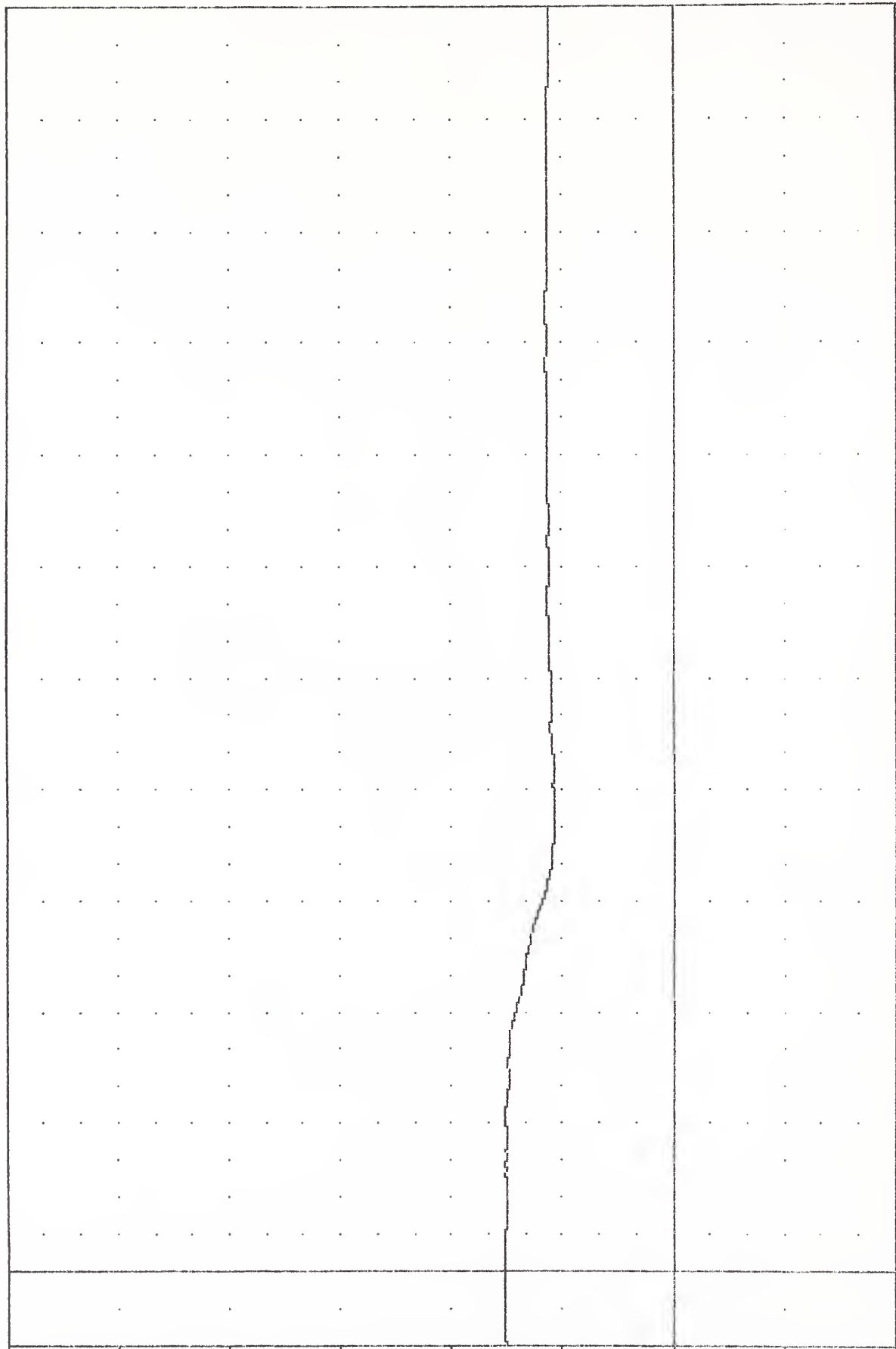
TRC , 841008
 SIDE AGGRESSIVE ATTRIBUTES
 842820000000
 BCGYV

PLOT DATE 17-OCT-84 10:18:53

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = 10.718 122.13, 15.22 8 -11.25

VELOCITY (MPH)



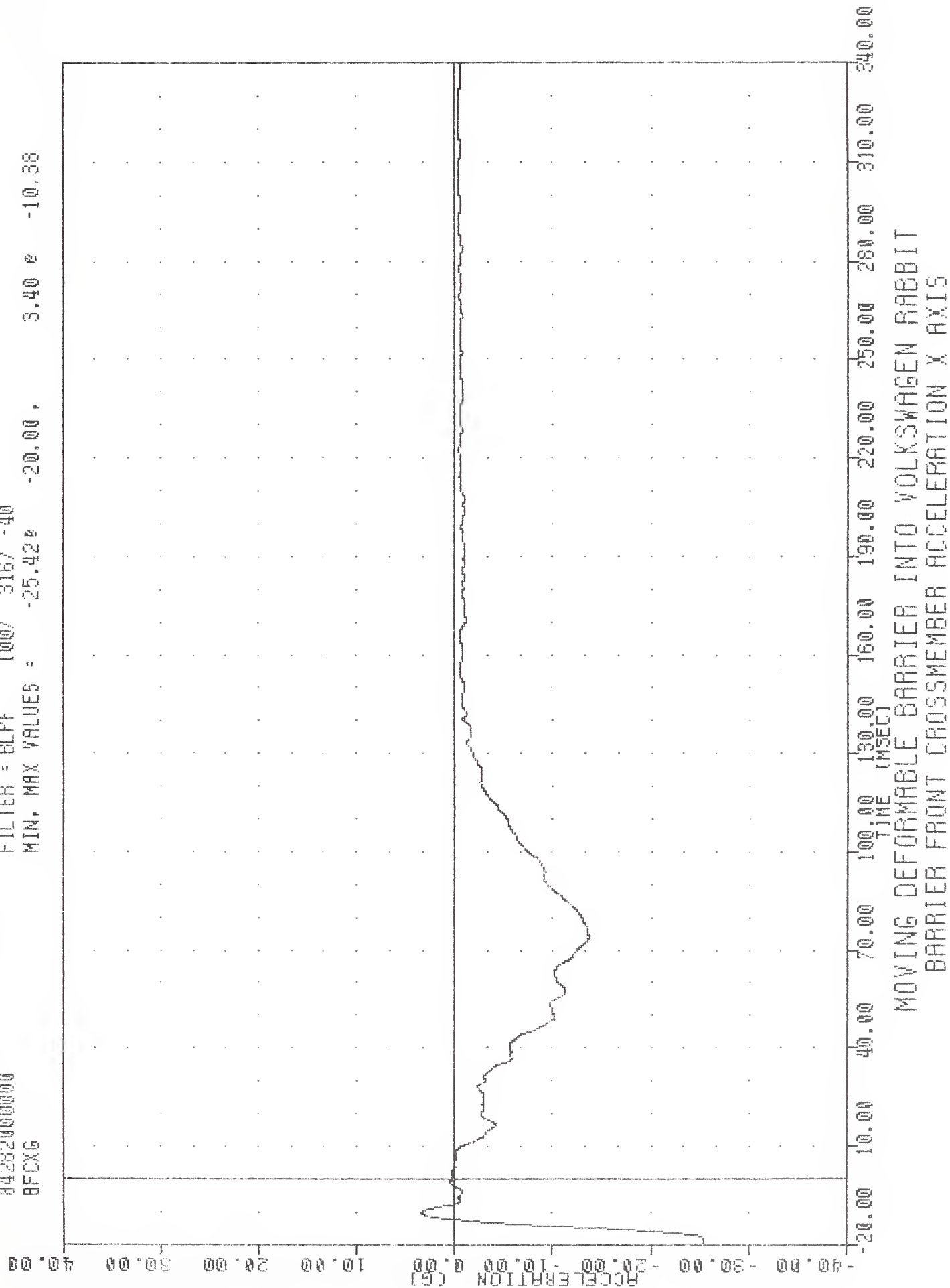
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING BCGY6

TRC , 841008
SIDE AGGRESSIVE ATTRIBUTES
84282000000
BFCXG

PLOT DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -25.42 3.40 e -10.38



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER FRONT CROSSMEMBER ACCELERATION X AXIS

TRC 841008 PLOT DATE 17-OCT-84 10:18:53

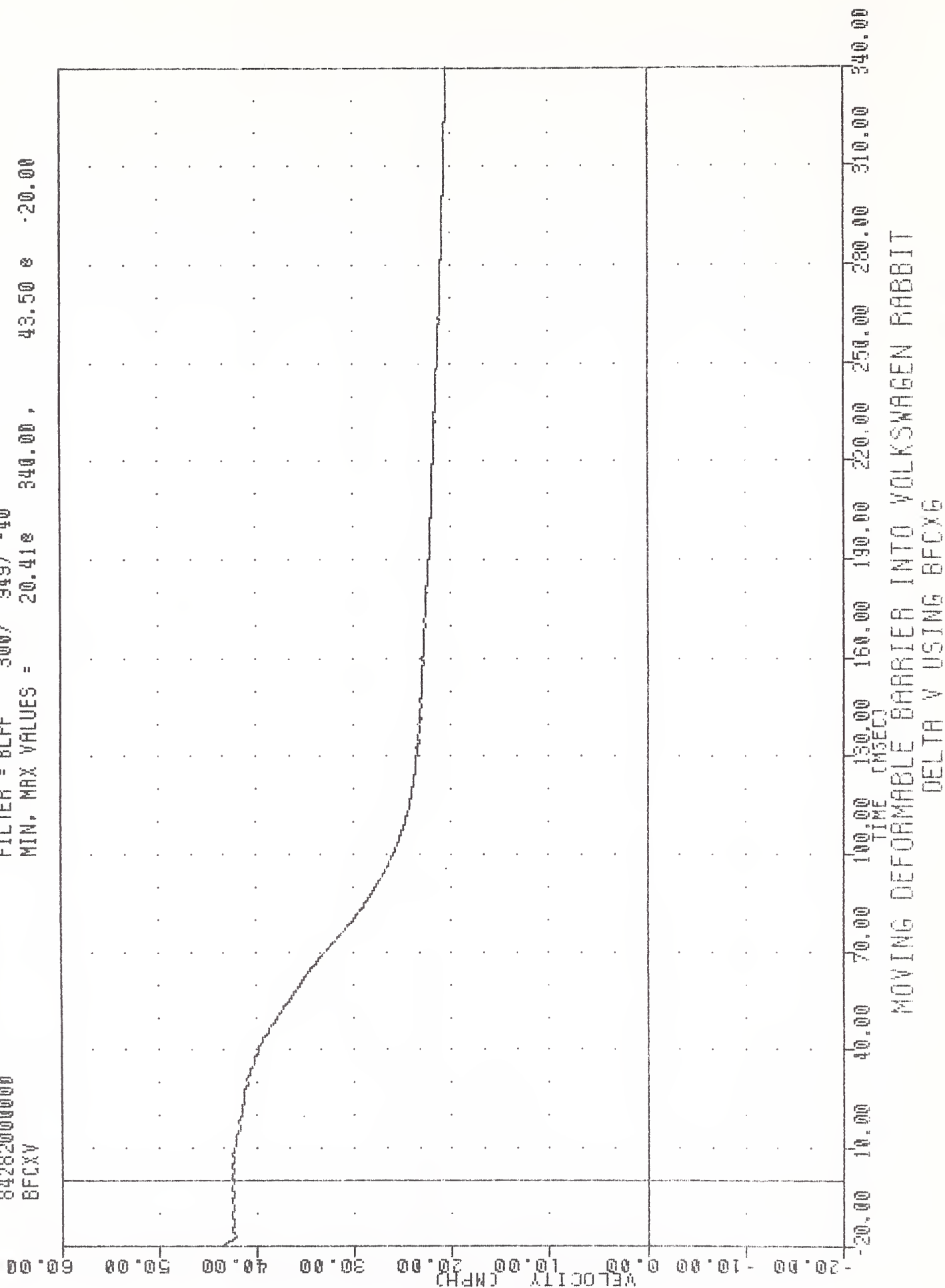
SIDE AGGRESSIVE ATTRIBUTES

84282000000

BFCXV

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = 20.418 340.00, 43.50 8 -20.00

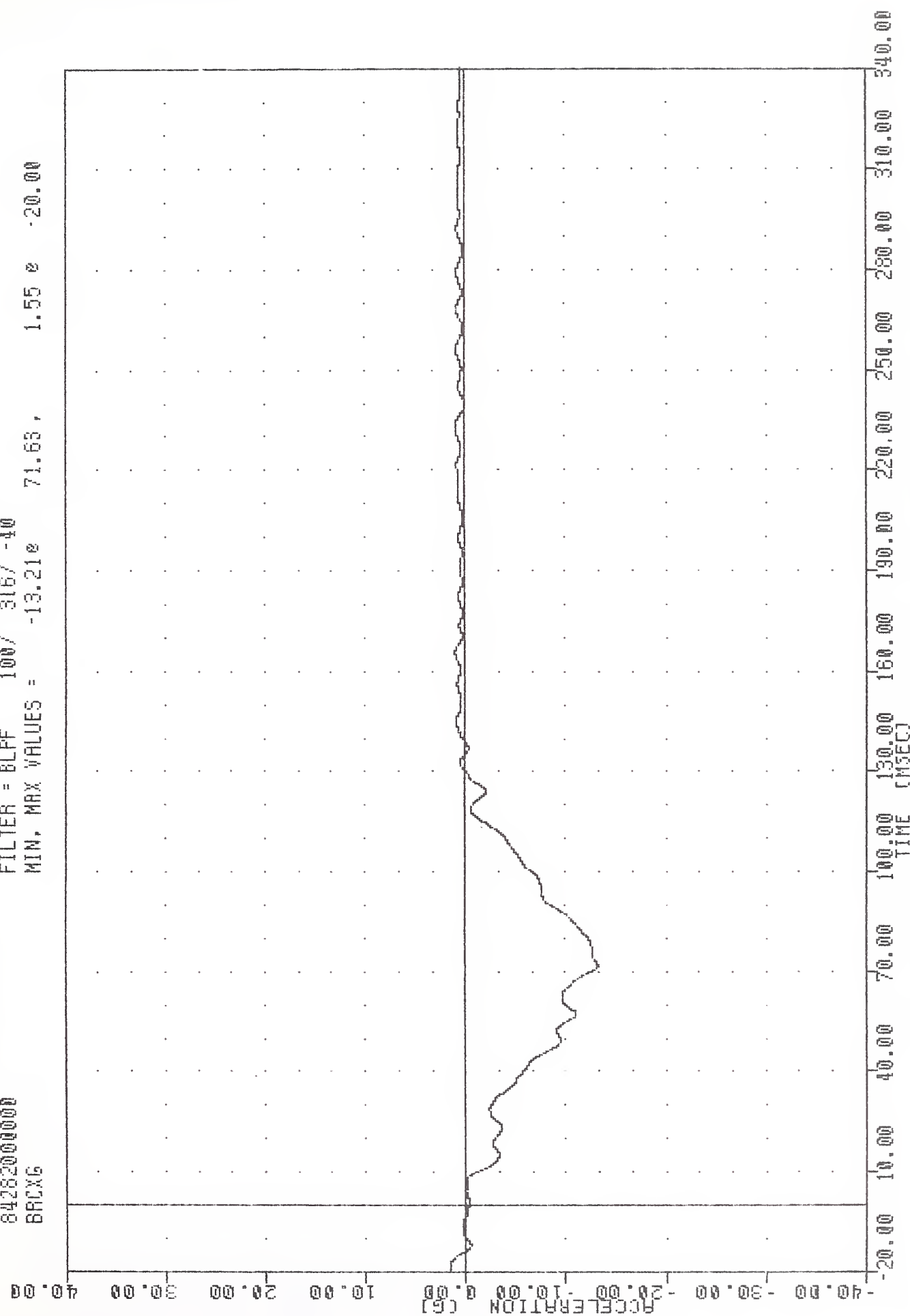


THU , 841008
SIDE AGGRESSIVE ATTRIBUTES
84262000000
BRXG

PLU1 DATE 17-OCT-84 10:16:30

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -13.21e 71.63, 1.55 e -20.00



THU 841008 17-OCT-84 10:18:53

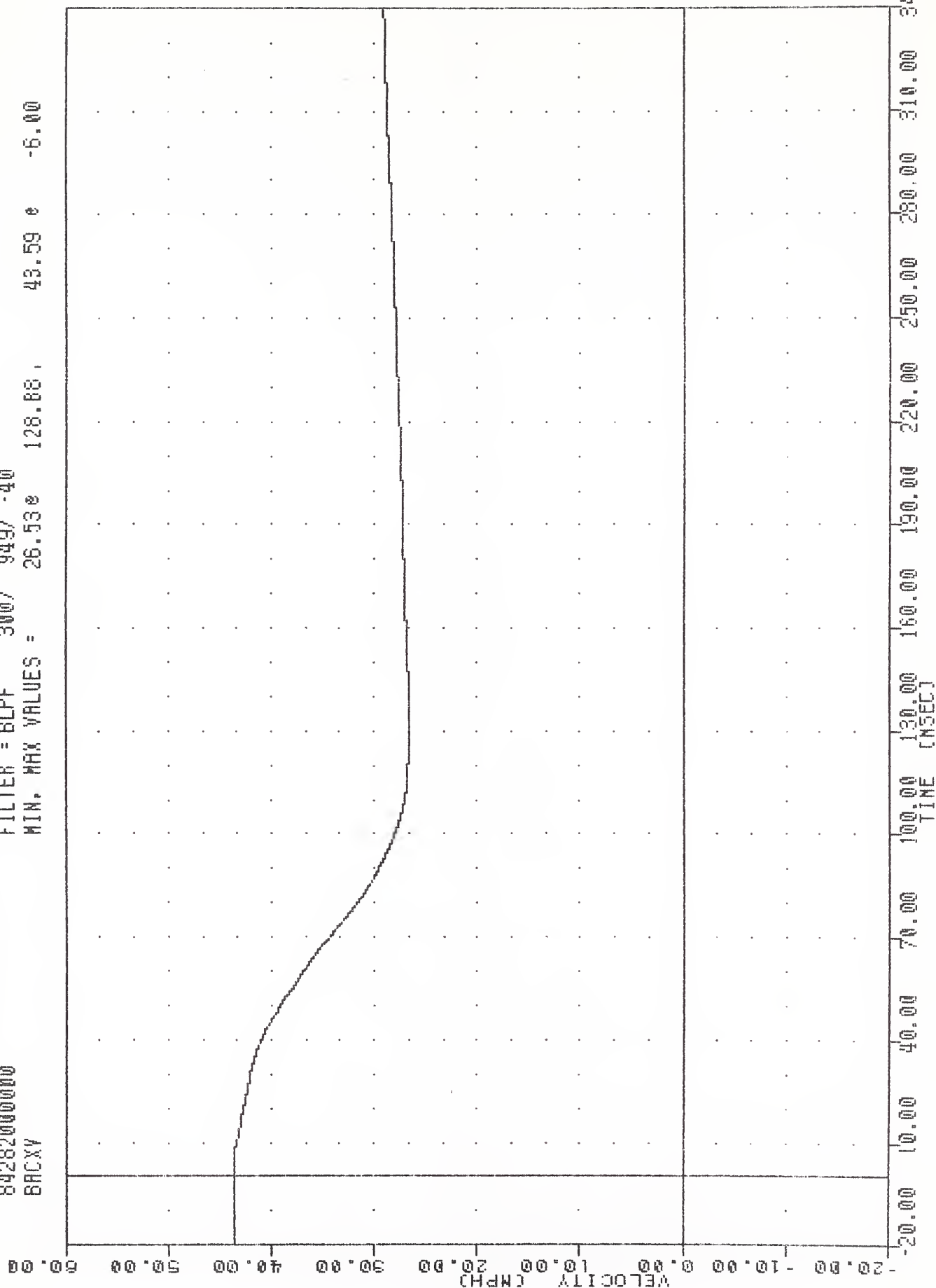
SIDE AGGRESSIVE ATTRIBUTES

842820000000

BRCXY

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 26.53 128.88 43.59 -6.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BRCXG

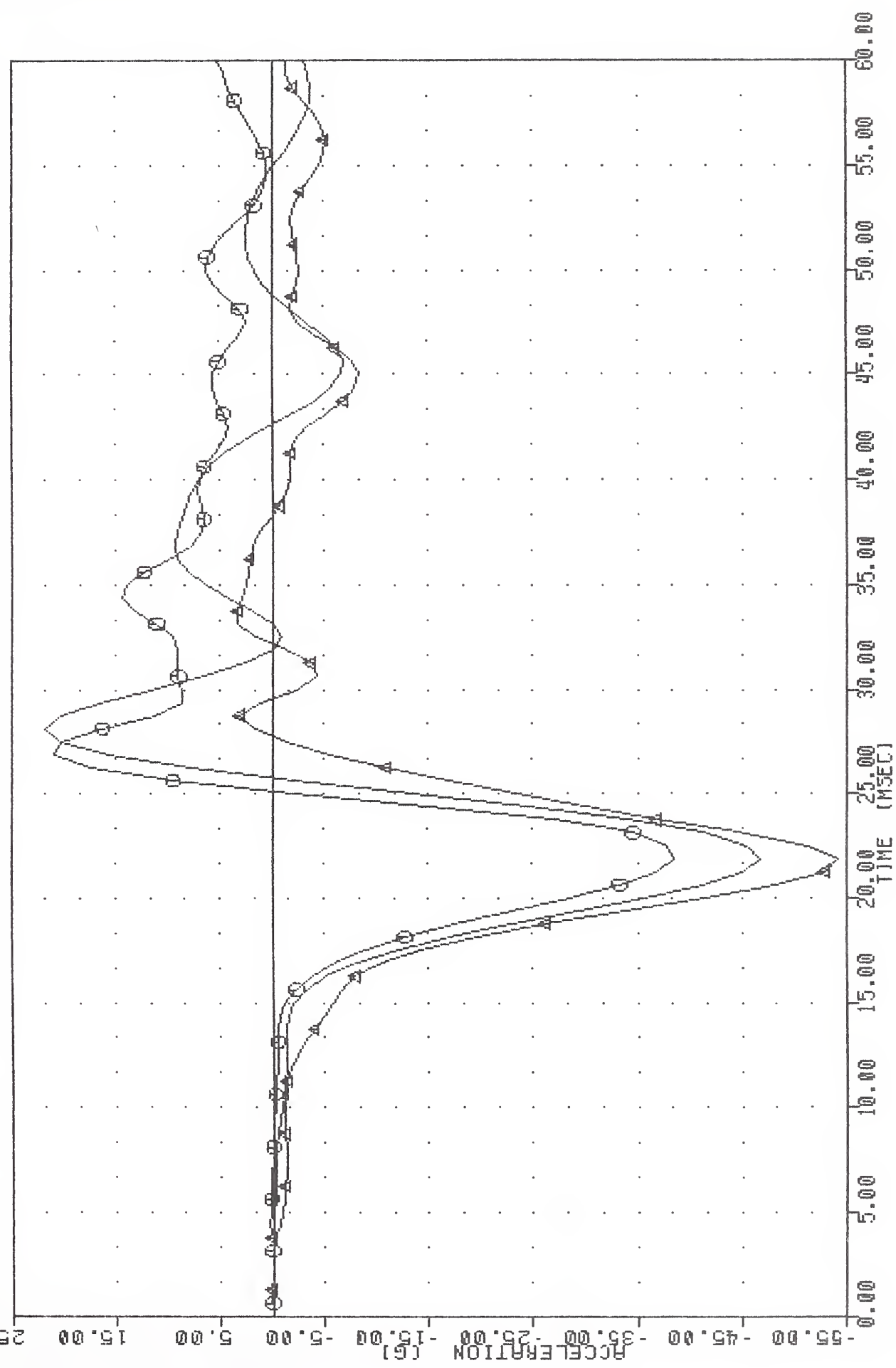
APPENDIX C
DUMMY CERTIFICATION

11:30:12
28.13
26.25
33.13



LEFT UPPER RIB ACCELERATION Y AXIS - 1

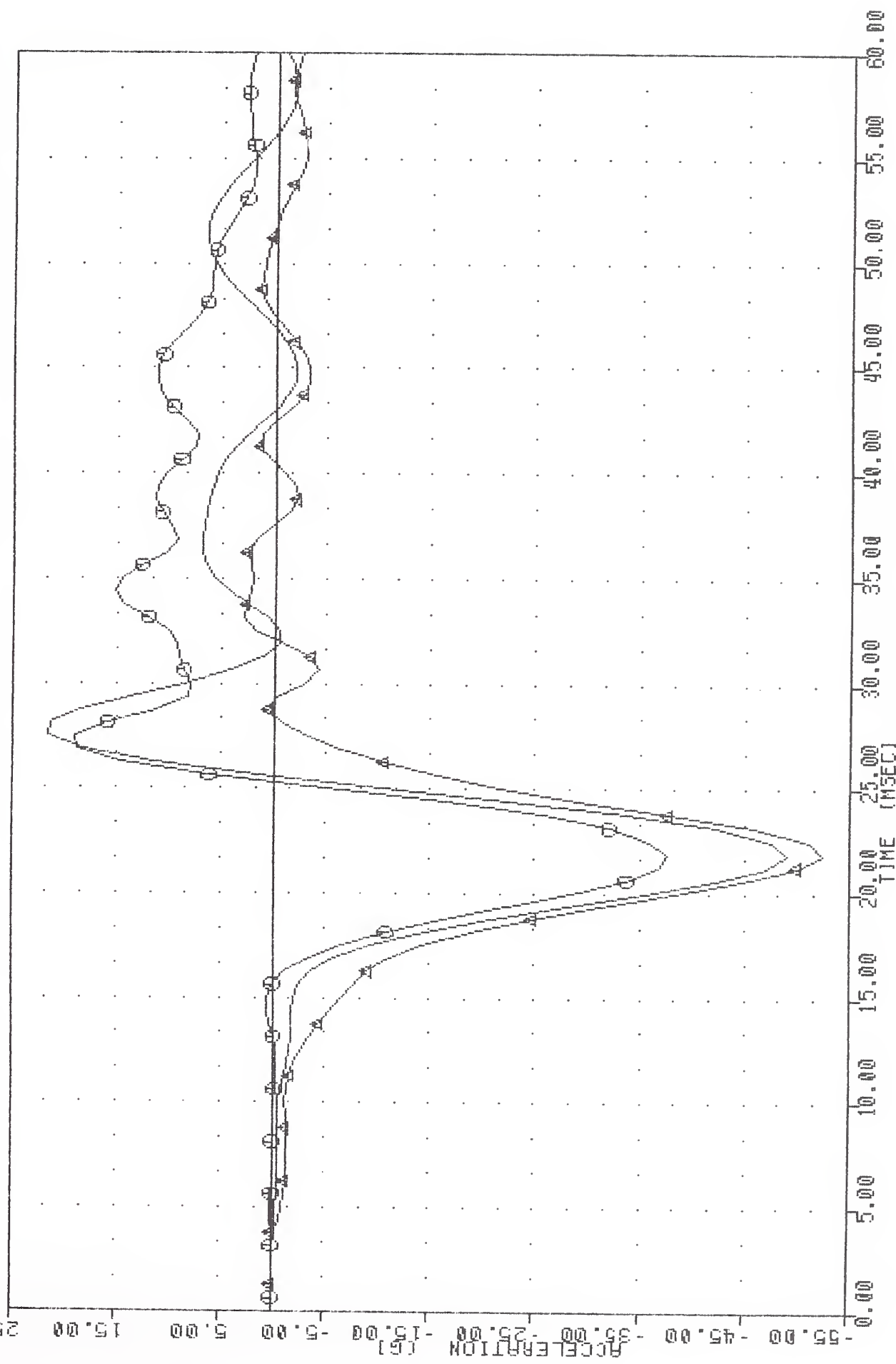
vntc 3ml32 , 3i00b113 3i0 invRAX 006 Buu1 3i0 cAlJ113 PLu1 DATE 13-UL1-84 11:39:26
 LURYGA FILTER : HSRI 136/ 189/ -50 MIN. MAX = -46.78 21.25, 21.82 27.50
 MN-230 0 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -38.44 21.25, 20.92 26.25
 MN-230 A FILTER : HSRI 136/ 189/ -50 MIN. MAX = -54.08 21.25, 3.31 33.13



SIDE IMPACT TEST (006)
 LEFT UPPER RIB ACCELERATION Y AXIS - A

[illegible]

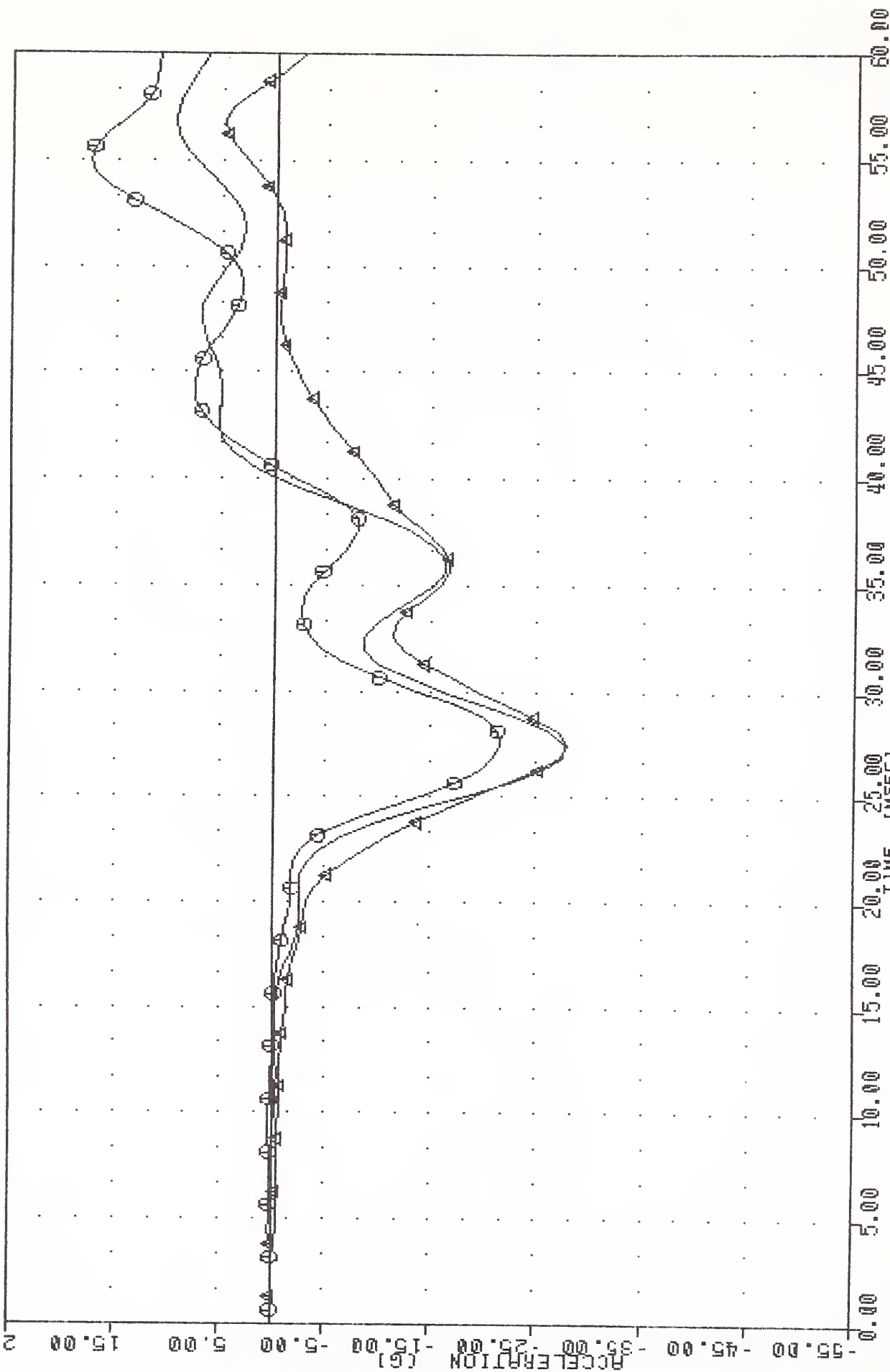
VHTC SRL92 , S1006113 SID IHURAX 0006 BOUT 318 UHL113 84286 PLU1 DATE 13-ULI-84 11:37:11
 LLRYGA FILTER : HSRI 136/ 189/ -50 MIN, MAX = -49.14 21.25 21.43 26.87
 MN-250 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -37.66 21.25 19.00 26.87
 MN-250 A FILTER : HSRI 136/ 189/ -50 MIN, MAX = -52.52 21.25 2.94 32.50



SIDE IMPACT TEST (0006)

LEFT LOWER RIB ACCELERATION Y AXIS - A

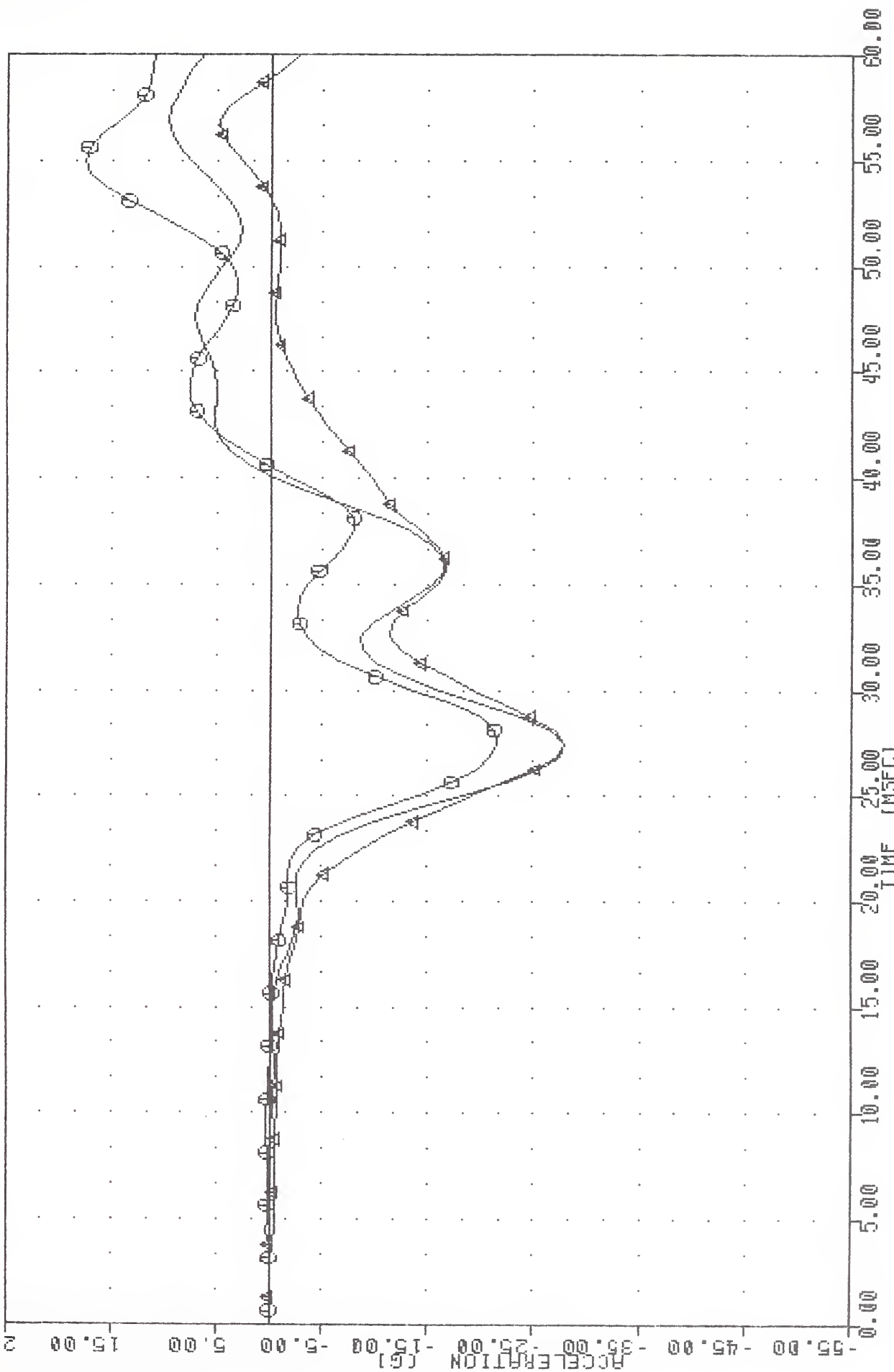
YHIC 5RL92 SID JHURAX 0006 BUOY 318 CAL113 PLUI DATE 13-DEC-84 11:31:05
 T01YGI FILTER = HSRI 136/ 189/ -50 MIN, MAX = -27.64 9.47 56.25
 MN+2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -21.58 17.54 54.38
 MN-2SD 4 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -27.91 4.78 56.25



SIDE IMPACT TEST (0006)

UPPER SPINE ACCELERATION Y AXIS - 1

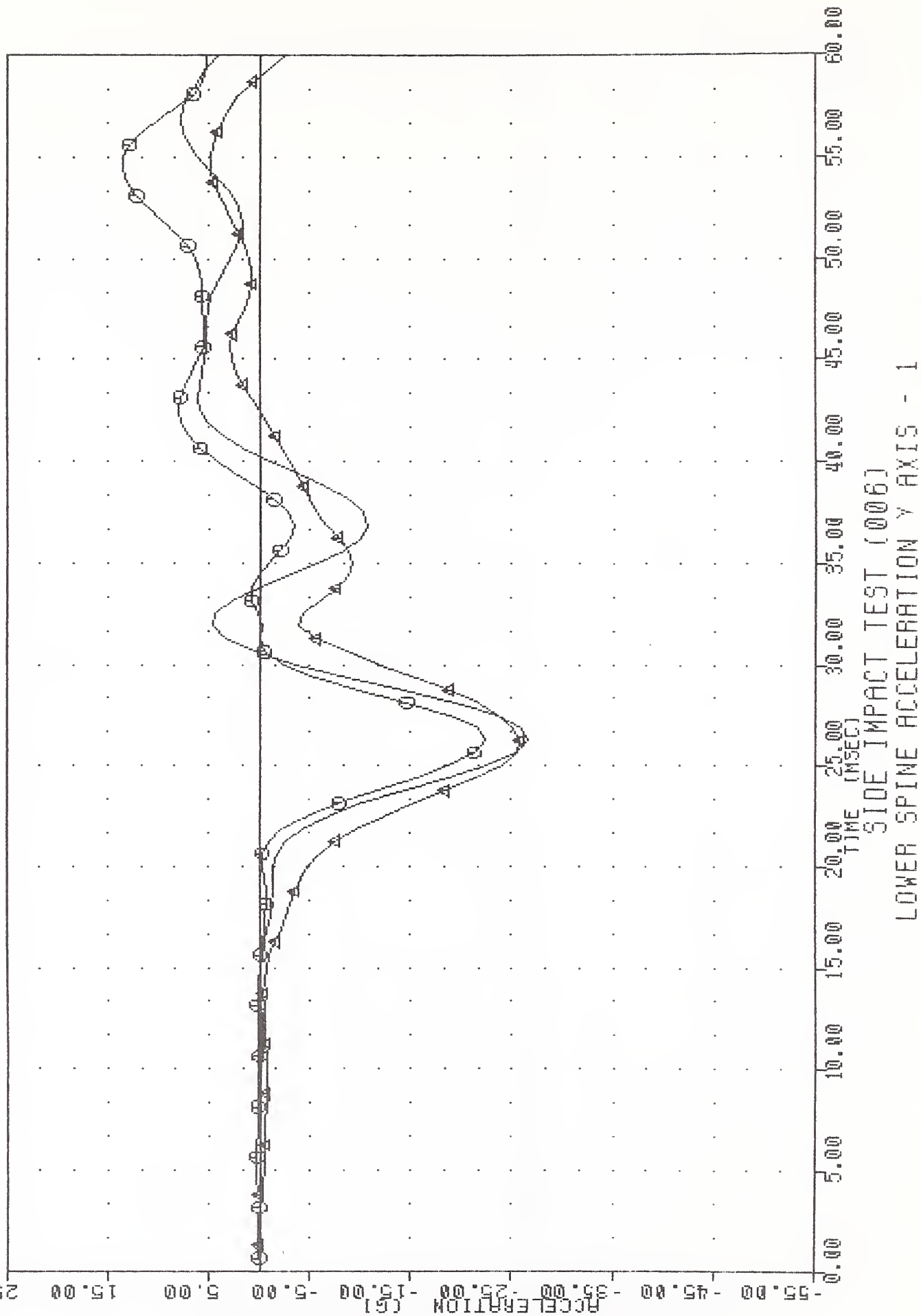
VRTC SRL92 • S1006113 SID IHURAX 0W6 BUIY 318 CAL113 84286 PLUT DATE 13-UC1-84 11:32:19
 T01YGA FILTER = HSRI 136/ 189/ -50 MIN. MAX = -27.86 e 9.55e 56.25
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -21.68 e 17.54e 54.38
 MN-2SD 4 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -27.91 e 4.76e 56.25



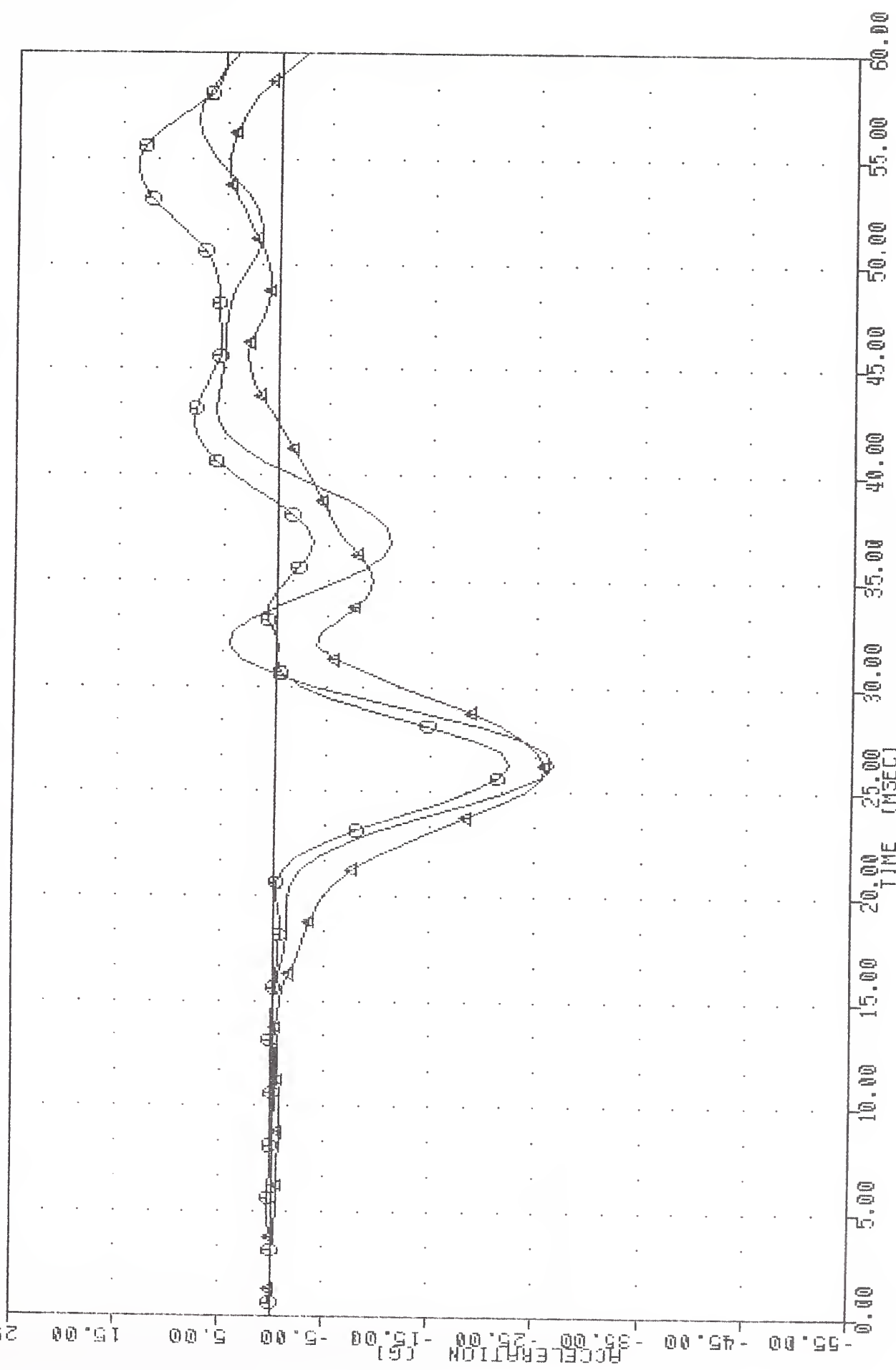
SIDE IMPACT TEST (006)

UPPER SPINE ACCELERATION Y AXIS - A

YHIC SHL92 SID IHURAX 0006 BODY 318 CAL113 84286 PLOT DATE 13-OCT-84 11:33:39
 T12Y61 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -26.68 25.63 7.82 56.25
 MN-2SD 0 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -22.37 25.63 13.54 53.75
 MN-2SD 1 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -25.64 25.63 4.85 53.75



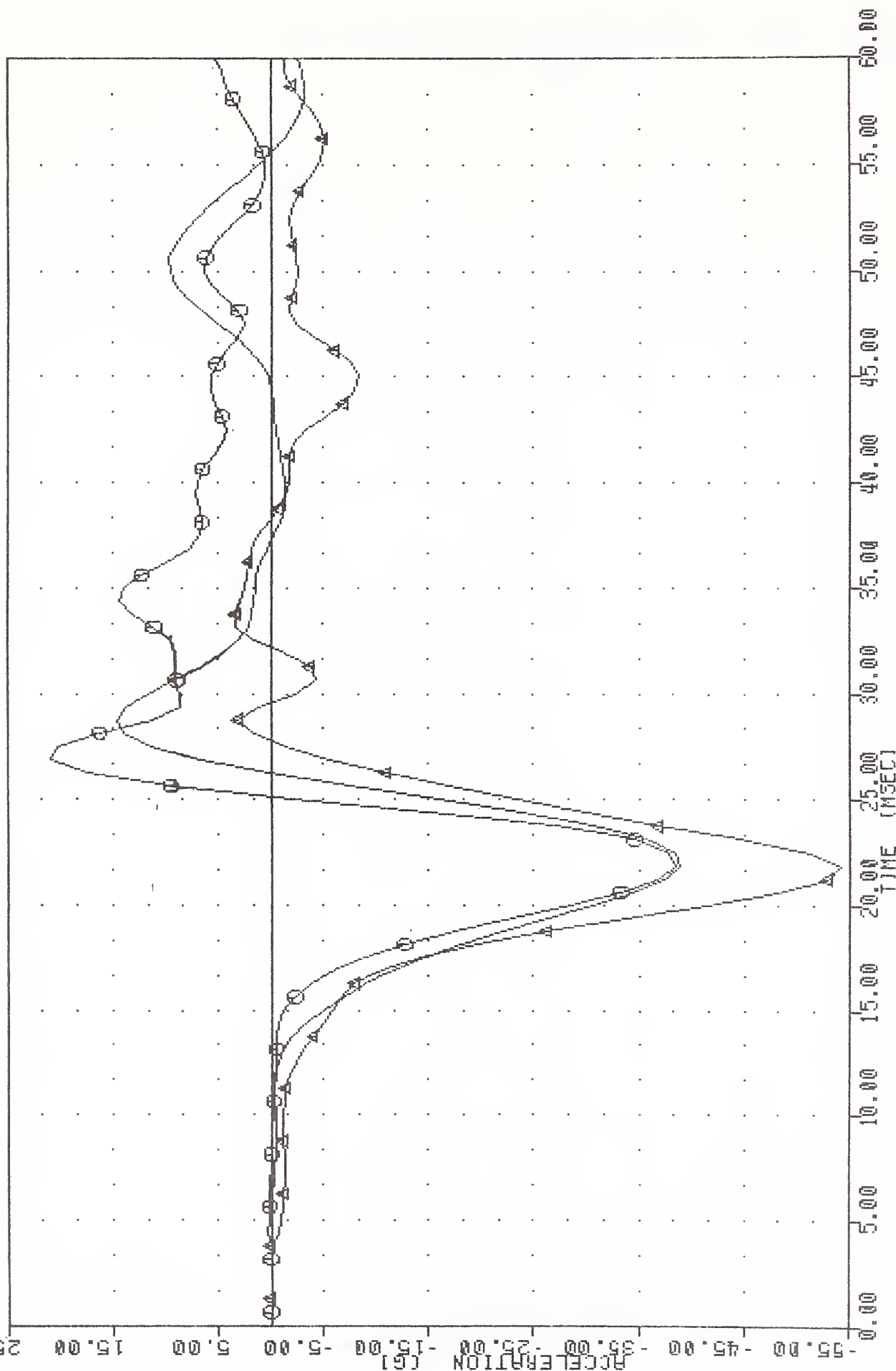
VRTC SHL92 SID IHURAX W06 BODY 318 CAL113 84286 PLOT DATE 13-OCT-84 11:34:34
 T12YGA FILTER : HSRI 136/ 189/ -50 MIN, MAX = -26.57 25.63 7.74 56.25
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -22.37 25.63 13.54 53.75
 MN-2SD 1 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -25.84 25.63 4.85 53.75



SIDE IMPACT TEST (006)

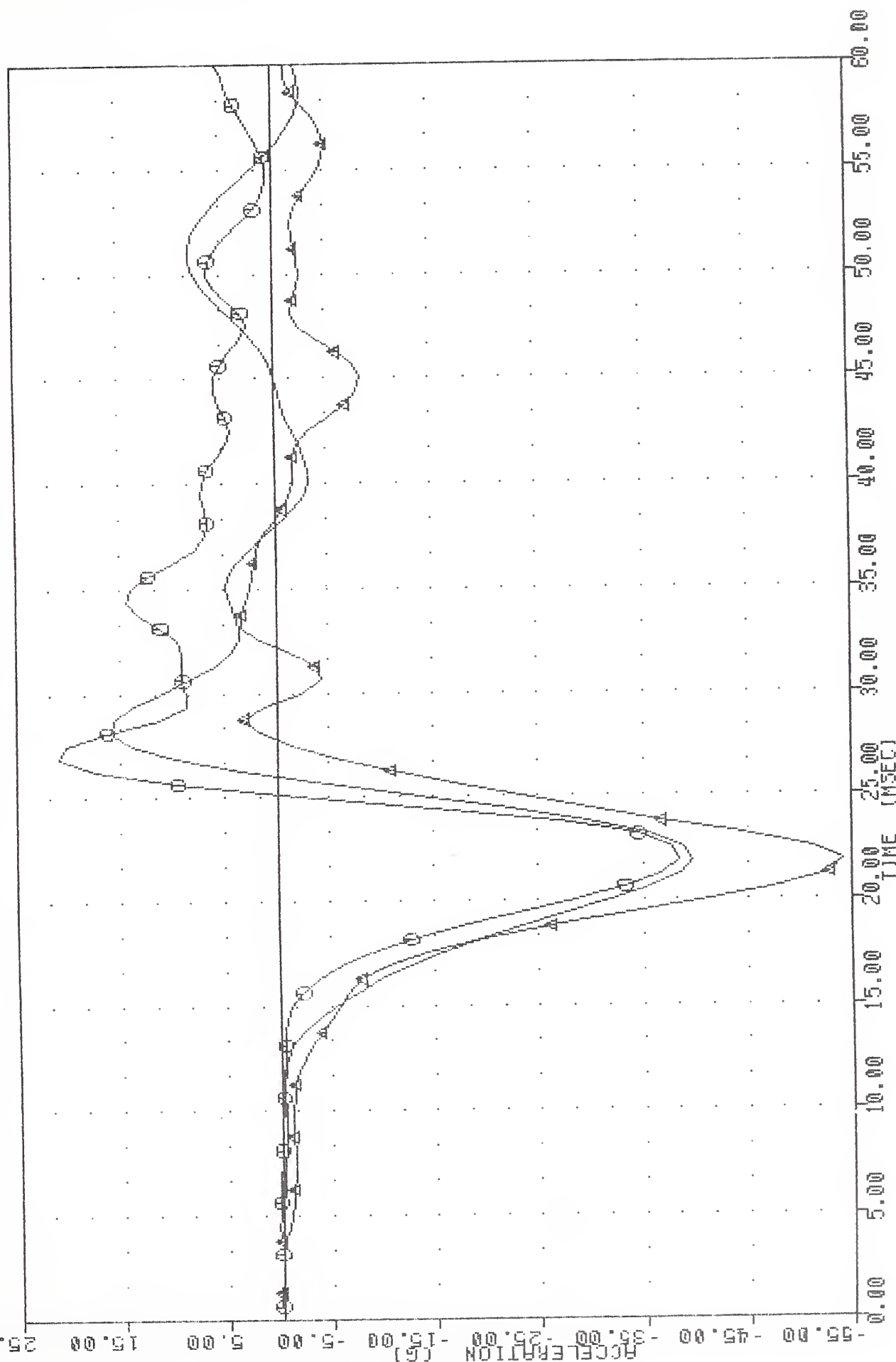
LOWER SPINE ACCELERATION Y AXIS - A

VHTC 3RL92 , S1U02112 STD IHURAX U02 BUUY 83W UHL112 84285 PLOT DATE 13-OCT-84 11:44:51
 LURYG1 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -38.95 0 21.25, 14.64 0 28.13
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -38.44 0 21.25, 20.92 0 26.25
 MN-2SD A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -54.08 0 21.25, 3.31 0 33.13



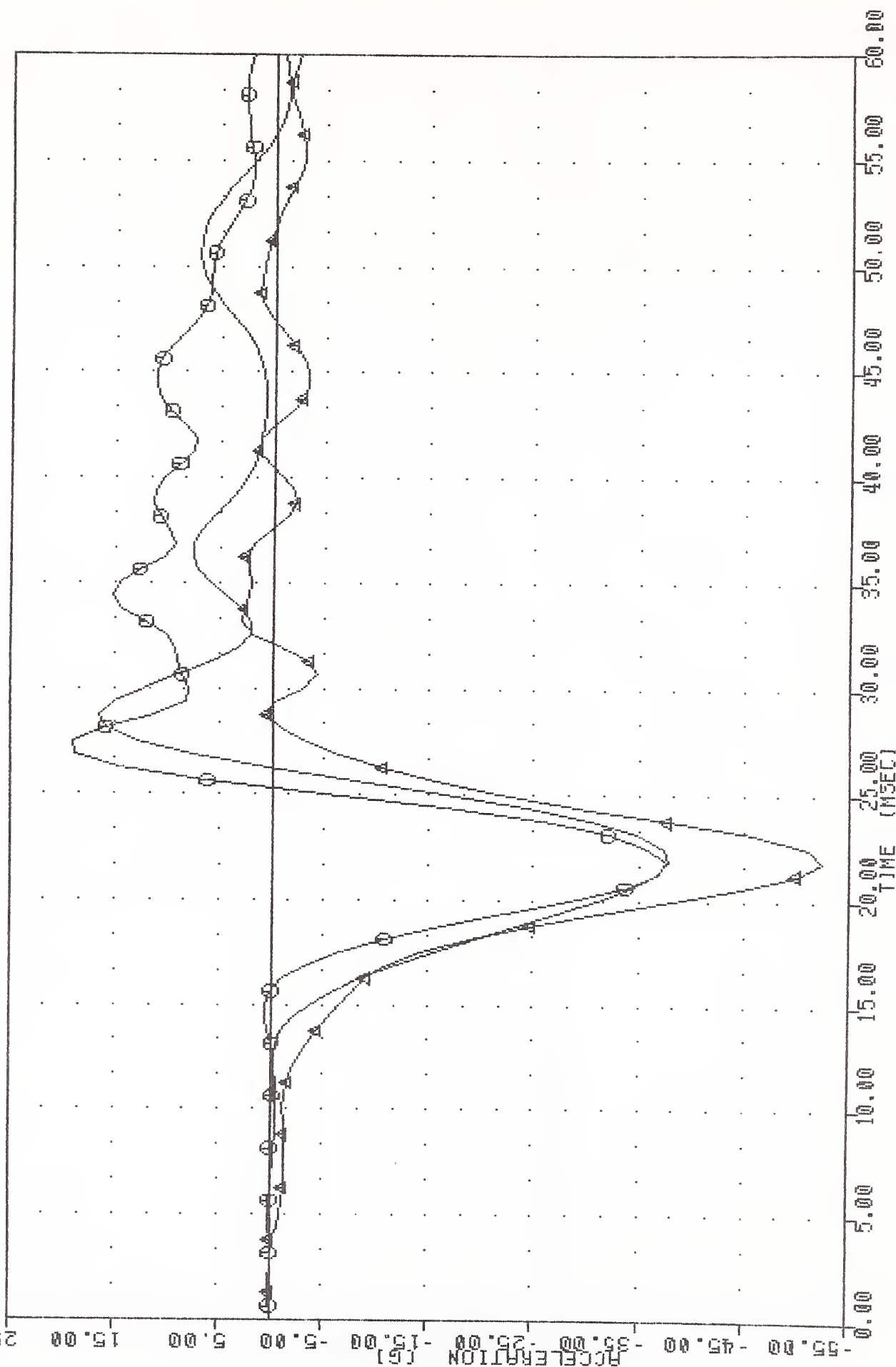
SIDE IMPACT TEST (U02)
 LEFT UPPER RIB ACCELERATION Y AXIS

VMIC 3HL92 * 51002112 SID IHURAX UW2 BUUV 83N LAL112 84265 PLOT DATE 13-OCT-84 11:45:51
 LURYGA FILTER = H3RI 136/ 189/ -50 MIN, MAX = -39.80 21.25 15.90 27.50
 MN-250 0 FILTER = H3RI 136/ 189/ -50 MIN, MAX = -38.44 21.25 20.92 26.25
 MN-250 A FILTER = H3RI 136/ 189/ -50 MIN, MAX = -54.08 21.25 3.31 33.13



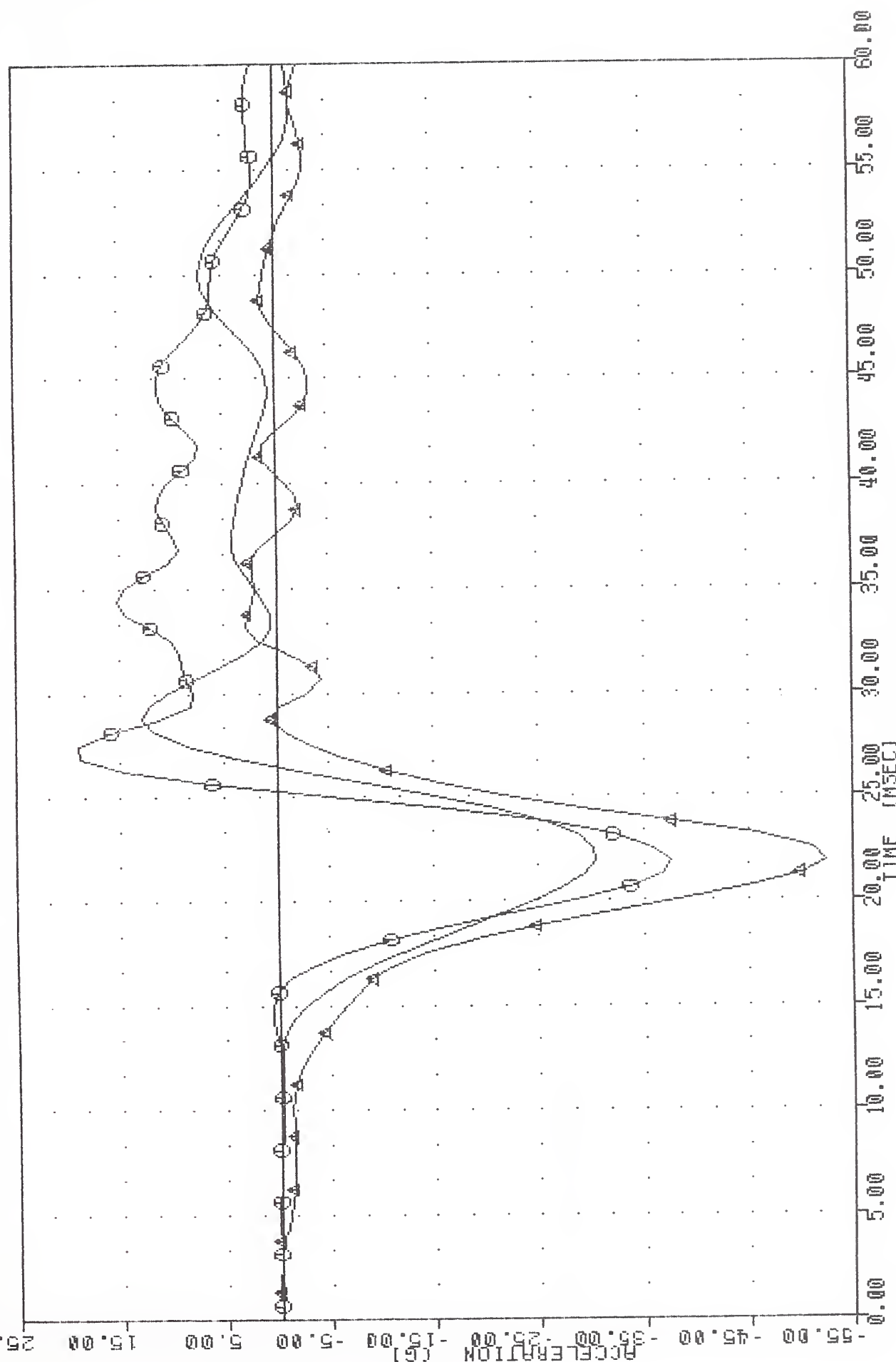
SIDE IMPACT TEST (U02)
 LEFT UPPER RIB ACCELERATION Y AXIS - A

VHC 3HL92 SID IHURAX U02 BODY 830 LAL112 84285 PLOT DATE 13-OCT-84 11:43:11
 LLYGI FILTER : HSRI 136/ 189/ -50 MIN, MAX = -37.80 21.25 16.40 28.13
 MN-250 U FILTER : HSRI 136/ 189/ -50 MIN, MAX = -37.86 21.25 19.00 26.87
 MN-250 A FILTER : HSRI 136/ 189/ -50 MIN, MAX = -52.52 21.25 2.94 32.50



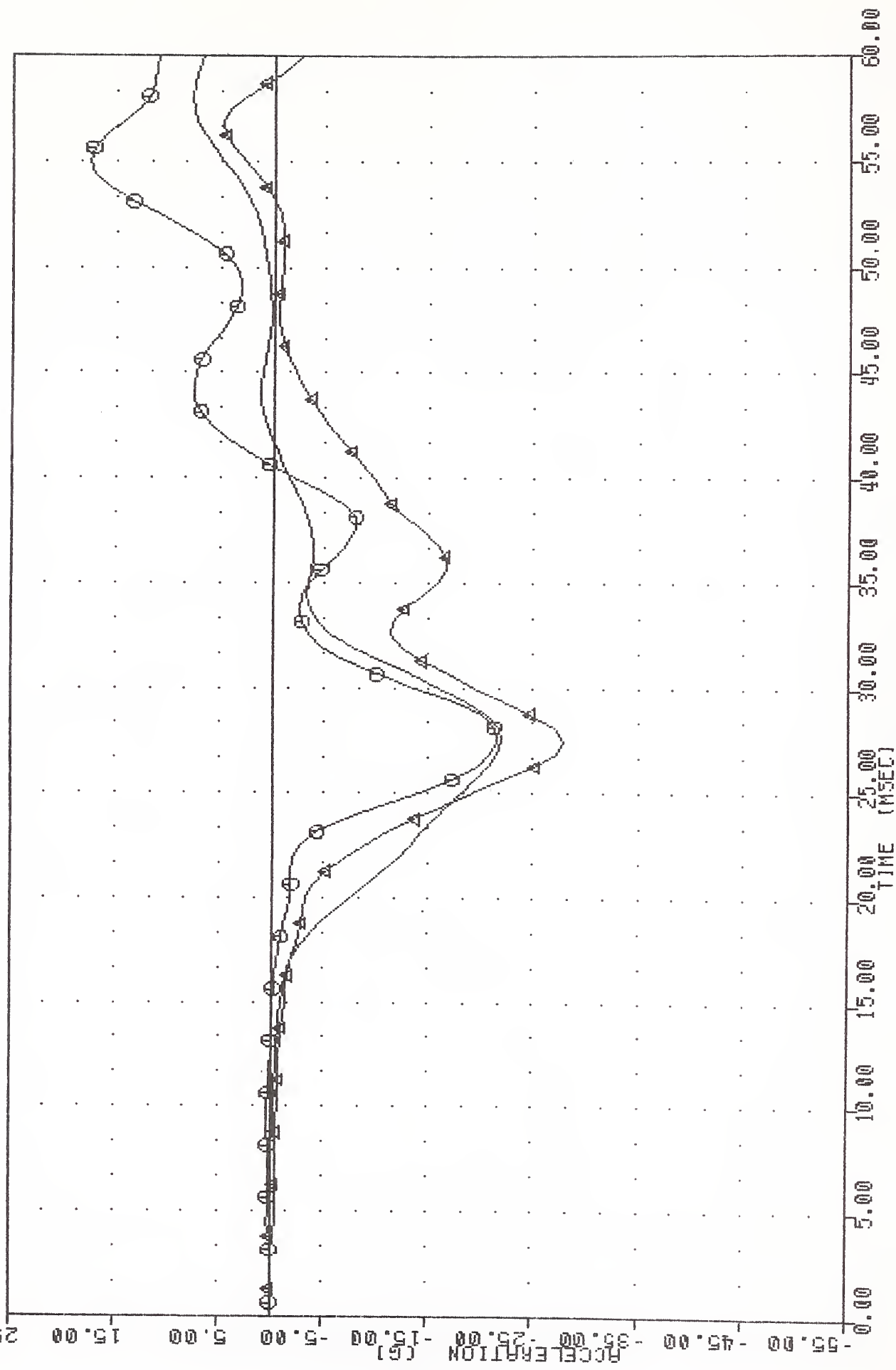
SIDE IMPACT TEST (U02)
 LEFT LOWER RIB ACCELERATION Y AXIS - 1

WTC 3RL32 • S1U02112 S1D IMURAX UW2 BUPT 83W LALJ112 84280 PLU1 DATE 13-UL1-84 11:44:06
 LCRYGA FILTER = HSRI 136/ 189/ -50 MIN, MAX = -30.43 21.25, 12.75 28.13
 MN+2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -37.68 21.25, 19.00 28.87
 MN-2SD 4 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -52.52 21.25, 2.94 32.50



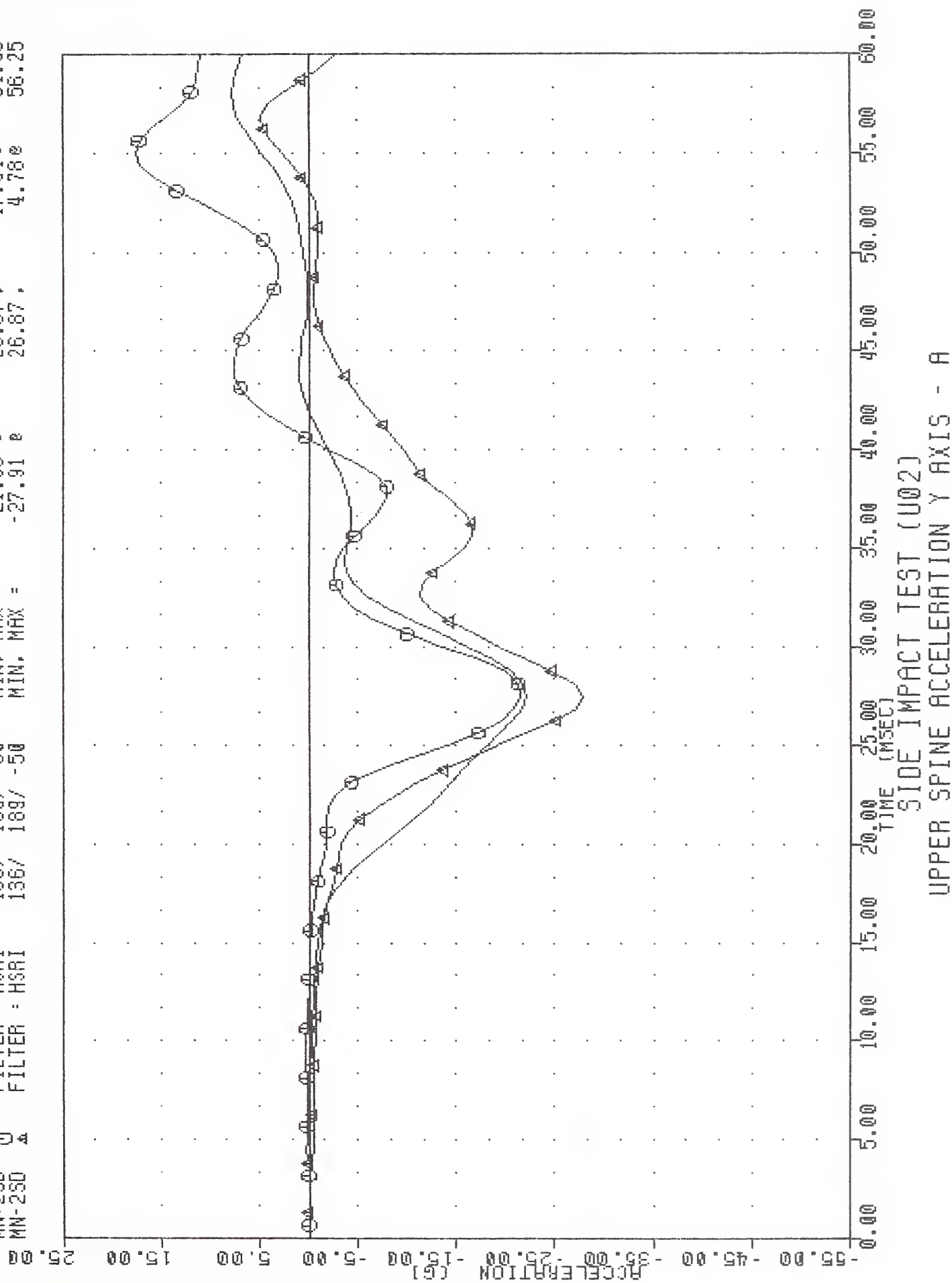
SIDE IMPACT TEST (U02)
 LEFT LOWER RIB ACCELERATION Y AXIS - A

VHTC SHL92 , S1002112 SID IMURAX UW2 BUOY 83W LAL112 PLU1 DATE 13-UL-84 11:20:34
 TO1Y61 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -21.97 26.87 7.73 57.50
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -21.58 26.87 17.54 54.38
 MN-2SD A FILTER : HSRI 136/ 189/ -50 MIN, MAX = -27.91 26.87 4.78 56.25



SIDE IMPACT TEST (U02)
 UPPER SPINE ACCELERATION Y AXIS - 1

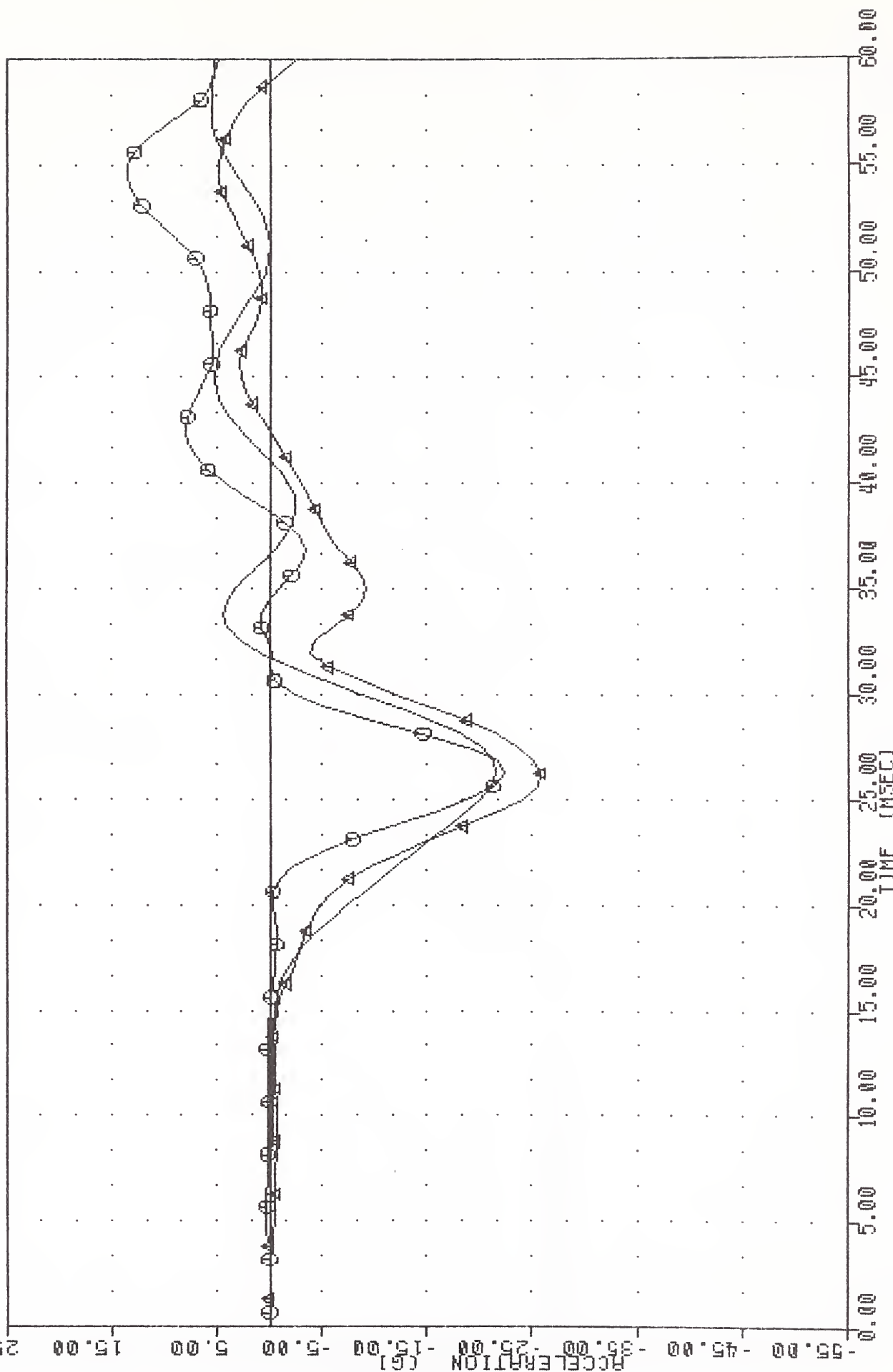
WHIC 3HL92 • S1U02112 SID IHURAX UW2 BUUY 83W LALJ12 84285 PLU1 URTE 13-UL1-84 11:31:41
 T01YGA FILTER = HSRI 136/ 189/ -50 MIN. MAX = -22.10 0 26.87 7.730 57.50
 MN-250 0 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -21.58 0 26.87 17.540 54.38
 MN-250 A FILTER = HSRI 136/ 189/ -50 MIN. MAX = -27.91 0 26.87 4.780 56.25



SIDE IMPACT TEST (U02)

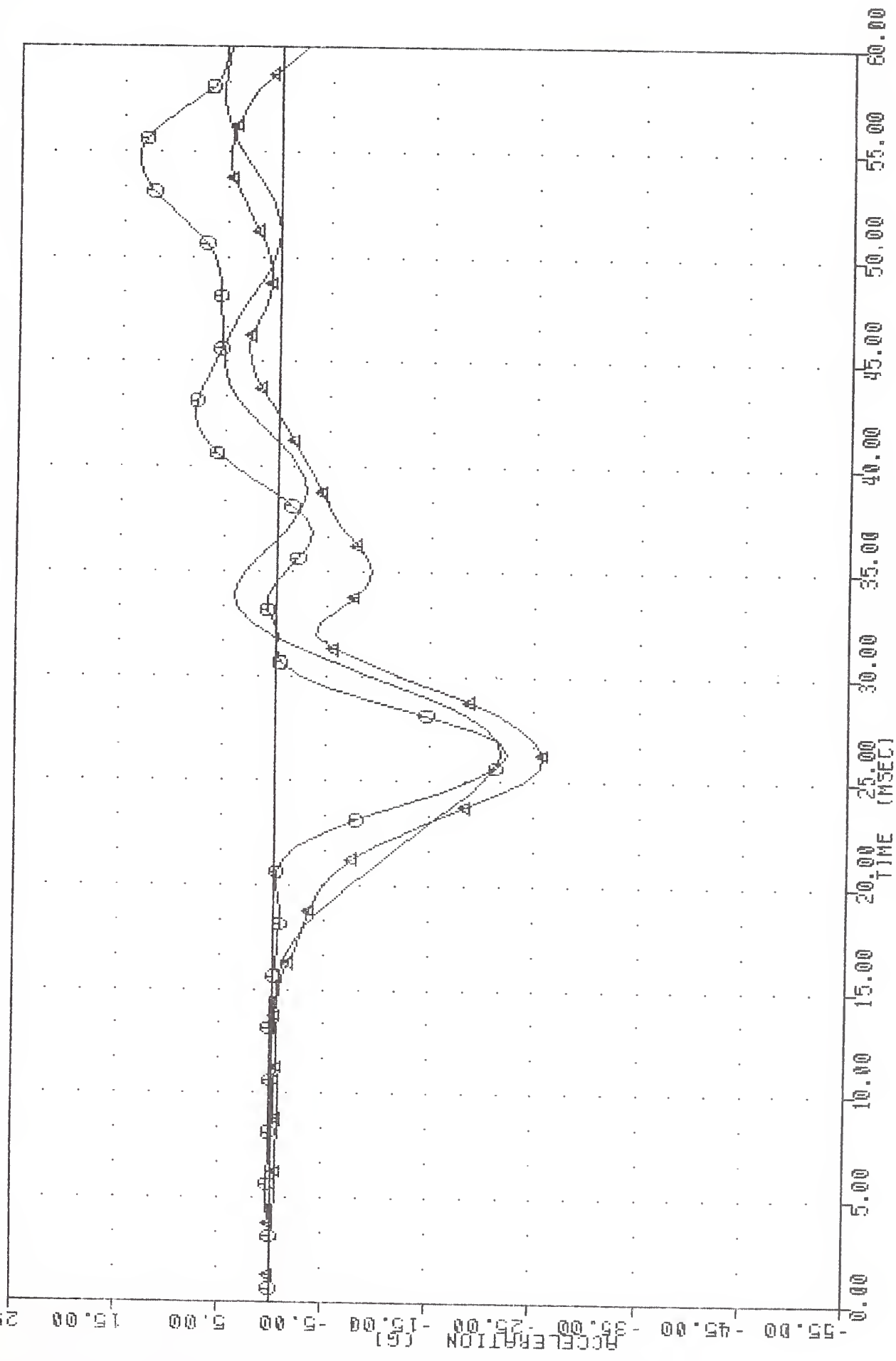
UPPER SPINE ACCELERATION Y AXIS - A

YHTC 5HL92 SID 1HURAX UW2 BUUY 83W CAL112 PLU1 DATE 13-UC1-84 11:32:48
 T12Y61 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -21.53 5.51 56.87
 MN-250 0 FILTER = HSRI 136/ 189/ -50 MIN. MAX = -22.37 13.54 53.75
 MN-250 A FILTER = HSRI 136/ 189/ -50 MIN. MAX = -25.84 4.85 53.75



SIDE IMPACT TEST (U02)
 LOWER SPINE ACCELERATION Y AXIS - 1

VRIC SHL92 SID 1HURAX U02 BODY 83W CAL112 84285
 T12YGA FILTER = HSRI 136/ 189/ -50 MIN, MAX = -21.70 25.63 11:34:09
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -22.37 25.63 56.87
 MN-2SD A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -25.84 25.63 53.75



SIDE IMPACT TEST (U02)

LOWER SPINE ACCELERATION Y AXIS - A

TL 242 .B455

Bell, L. 195

Side-impact
attributed

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